The Veterinary Record

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888.

No. 3. JANUARY 19, 1935. VOL. XV.

General Articles

THE INFLUENCE OF ANTE-NATAL AND EARLY POST-NATAL HEALTH OF CALVES UPON THEIR VIGOUR AND FERTILITY AS ADULTS*

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INTRODUCTION

The importance of the diseases of young animals is generally estimated in terms of the death-rate. Clinical observations are presented in this report upon the possible effects of diseases of ante-natal and early post-natal life, which do not terminate fatally, on the fertility of the affected animals in adult life. Calves provide the most valuable material for study, because of the division of cattle into distinct classes, *viz.*, the dairy and the beef breeds. The young of the dairy cattle, which are reared artificially, constitute the most unhealthy group of subjects among all the domestic mammals, while the young of beef cattle are reared naturally and are conspicuously healthy. It may be presumed that any conclusions or inferences drawn from a study of calves are applicable in principle to other young mammals.

ESTABLISHMENT OF A DAIRY HERD WITHIN A LARGE BEEF HERD IN A SUB-TROPICAL AREA IN U.S.A.

The observations upon which this report is based were made upon a herd of several hundred Holstein-Friesian cattle. This herd was maintained in intimate contact with a much larger herd, of twenty-five thousand Herefords. They were all kept permanently out of doors and subsisted upon natural forage; they were handled as nearly alike as was possible. The forage was of great variety. The temperature varied between 50 and 85°F. The estate was conservatively stocked, assuring at all times an ample supply of forage the nutritive value of which became greatly lowered during severe drought. There were no running streams, springs, lakes or wells. Ample water was brought in water mains and was constantly available.

The area is free from highly destructive infectious diseases and had been devoted to the beef cattle industry for 50 years prior to establishing the dairy herd. Into the centre of the area occupied by the Hereford herd there were introduced 20 highly-bred Holstein-Friesian heifers and five bulls in 1920 and another 35 heifers in 1921. When purchased, 31 heifers were pregnant and 24 unbred. The animals were procured in lots of from two to 17, from eight breeding herds scattered over a wide area from the Atlantic seaboard to North Dakota. Since founding the herd no animals of either sex have been added and no fertile females have left the herd.

THE SERIOUS BREEDING TROUBLES THAT ENSUED IN THE DAIRY HERD WHILE THE BEEF HERD REMAINED HEALTHY IN THIS RESPECT

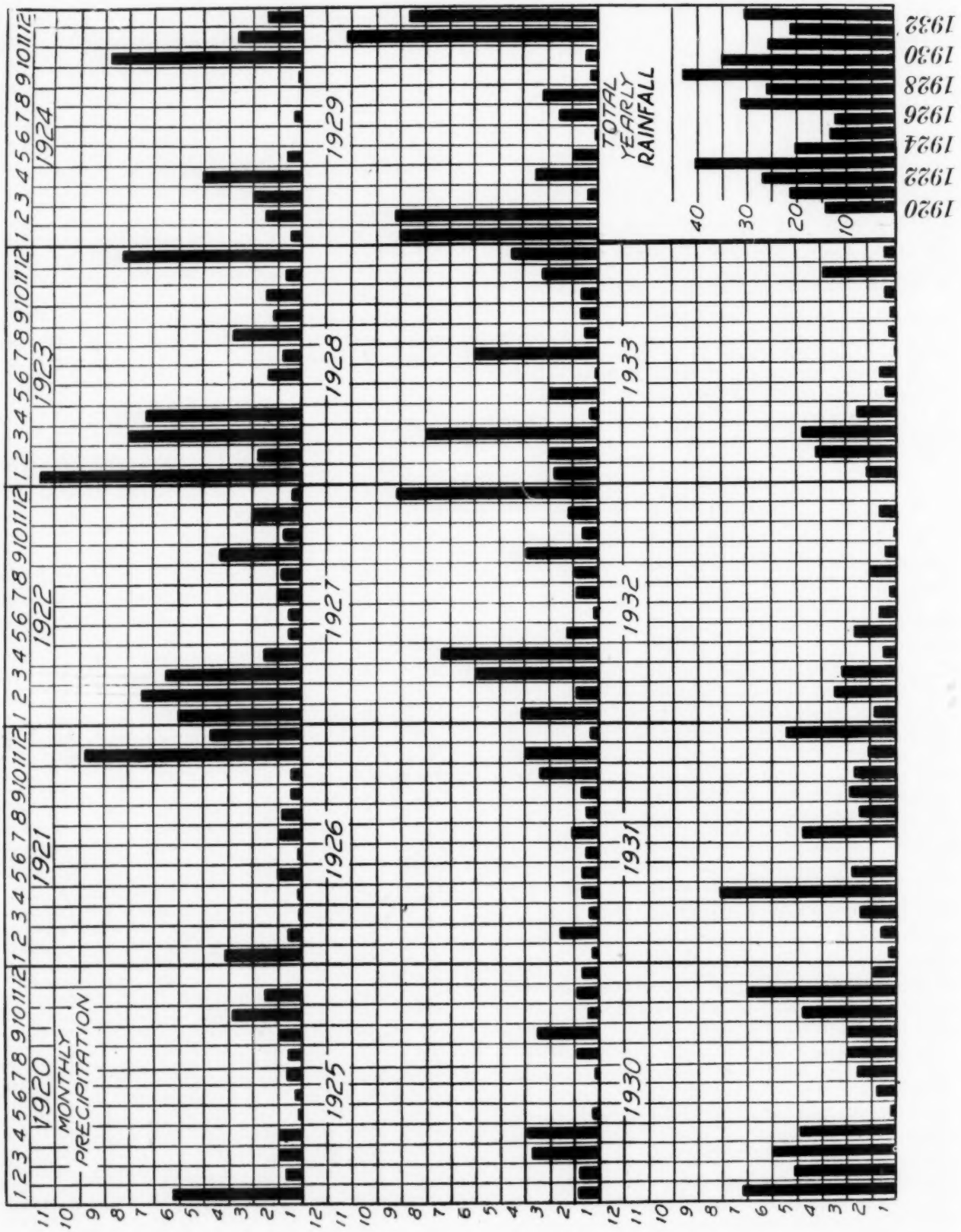
Twenty-one heifers of breeding age have been discarded as sterile, or have died without having been recognisably pregnant. According to the latest calculation, made on January 1st, 1934, at least one pregnancy had terminated in 322 females, with a total of 1,111 recorded pregnancies and 868 viable calves. Including the 21 heifers already mentioned, 122 females of breeding age have died or been discarded sterile, as follows: dystocia and puerperal sepsis, 31; sterility, 42; other genital causes, seven; miscellaneous and undetermined, 16.

The viable calves born during the 13·5 years covered by the observations are readily separable into distinct groups which have been subjected to known variations in the character of food and method of handling; and these groups can be authentically followed and their breeding efficiency determined throughout their breeding lives or to the present date. Except for the method of milk-feeding and the handling of the young calves, the Holstein-Friesians and contact Herefords were handled precisely alike from birth to the termination of the first pregnancy; when the Holstein-Friesians were placed in the milk herd they were allowed some grain and hay. Apart from the milk consumed by young calves, the heifers of both breeds were wholly dependent upon forage, the character of which was wholly dependent upon the rainfall.* The rainfall is accurately recorded for the 14 years concerned, the readings being made at the dairy (Chart I). The chart is dependable also for the rainfall in a belt of a mile or two immediately surrounding

* Paper No. 38, presented to the Twelfth International Veterinary Congress, New York, August, 1934.

* "Rainfall" in this article denotes total precipitation.

CHART I. Monthly Rainfall in Inches



the dairy, in which many hundreds of Hereford calves are born and raised to weaning age, thus affording reliable opportunity for comparison.

Origin and General History of the Cattle Composing the Dairy Herd

The 60 foundation animals from eight large breeding herds were in a position to carry into the new herd most readily any and all common chronic infections associated with breeding and transportable by pregnant or non-pregnant heifers, by fœtuses *in utero* or by bulls. There was every opportunity offered for the spread of any dangerous contagion from lot to lot of the foundation animals. The contact between the Holstein-Friesians and the Herefords was such that the transmission of any dangerous infection from one breed to the other was inevitable.

The largest lot of heifers, 17, came from a herd in which it was known that the rate of reproduction was unusually high, and the health of the calves excellent. Three heifers, purchased in 1920, simultaneously with the 17, were from a herd in which the breeding health was known to be only fair. They were purchased upon careful physical examination with the usual warranty of fertility. Two of them did very badly. The other 35 were selected upon physical examination from herds in which the breeding health was as high as the average of the country.

The 17 heifers from the excellent breeding herd constitute Group I in Table I. The other seven lots, comprising 38 heifers, make up Group II. The seven lots varied widely in performance, but none did as well as Group I. A study of Table I shows a remarkable superiority of Group I over Group II. In column 23 of Table I it appears at first glance that Group II is superior in the ratio of heifer calves, but in Group I the non-viable young is 6 per cent., while in Group II it is 16·4 per cent.

The records show that among the non-viable young the ratio of males to females in first pregnancy has been 270: 100 and in later pregnancies 252:100. There had been more male conceptions in Group II, but following the common rule a higher ratio of males were non-viable; according to my limited observations, the lower the breeding health of the herd, the higher the ratio of recognised male conceptions, and the higher the ratio of male deaths.

Table I indicates that four females of Group II died or were discarded without having produced living young, and some might exclude these from the computation, but that does not remove the inferiority. The average of the animals in Group II is about 1·5 years less than in Group I, but the mortality has been higher in the younger animals and the remaining cows, 13 or 14 years of age, would need to accomplish the impossible by producing, on the average, an additional 7·6 calves each. Had all heifers of Group II been pregnant when purchased, the low fertility might have been attributed to the bull used in first mating, but 23 of the 38 entered the herd unbred and were mated with the bulls used in Group I.

A detailed study from every recognised angle indicates that the heifers in Group II, when they entered the herd, were grossly inferior in breeding power to those in Group I, and that, their inferiority antedating their first conception, was vividly revealed by their behaviour in first pregnancy. The interval between the weaning time of heifer calves and the beginning of breeding, is most commonly the healthiest period of their lives.

Evidence that Diminished Reproductive Power was Traceable to Influences Acting upon the Animals in Early Life

It thus appears that the contrast in fertility in the two groups (shown in Table I) was dependent upon conditions already fixed at weaning time.

The influence of the ante-natal, and early post-natal health of calves upon their ultimate breeding power can be more accurately studied in the descendants of the original members of the herd which have passed beyond the period for the termination of their first gestations. The calves were handled as a mass in an enclosure ample in extent for abundant exercise and supplying such forage as the rainfall assured. The calves had ready access to coarse and dry forage, dead weeds and, at times, to fæces of horses and swine, and to other varieties of rubbish. Like most dairy calves, they took of these freely.

They had a liberal allowance of raw whole milk for three months and of separated milk for another three months, when they were placed with other young stock and became entirely dependent upon grazing until they had completed their first pregnancy and entered the milking herd. The calves were fed individually in pails. In the early history of the herd, while numbers were small, the feeding was accurate. When the numbers became greater, they naturally behaved like a hungry mob, the accuracy of the ration was disturbed, milk was spilled at the feeding place and the soil became polluted. During the first few years of the herd, the calves appeared in excellent health, grew rapidly and were very vigorous, but as the numbers increased their average health declined, and diarrhœa and pneumonia appeared. The mortality of calves, as recorded, was 6·8 per cent. In those calves not mortally ill, with which this report is chiefly concerned, the most significant signs of disease were sticky fæces, expelled at frequent intervals in small quantities, with slight straining, adhering tenaciously to the tail and surrounding parts; the calves were very pot-bellied, the hair rough, dry and lustreless; they were listless and played little, swallowed all sorts of rubbish, sucked each other inordinately and grew but little until weaning time, when they began to improve in harmony with the quality of the forage at the time.

Table I.

Group.	Year of purchase Groups I and II; Year of birth Group III.	Number in group.	Number in which first breeding period has terminated.	Results in first breeding period.											
				Viable bull calves.	Per cent.	Viable heifer calves.	Per cent.	Non-viable young.	Per cent.	Sterile.	Per cent.	Died or discarded after abortion or stillbirth without viable calves.	Per cent.	Increase or decrease of females from first breeding period. Cows plus heifer calves.	Per cent.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
I	1920	17	17	7	41·2	10	58·8	0	0	0	10·0	0	0	10	58·8
II	1920	38	38	17	44·8	10	26·3	10	26·3	1	2·6	3	7·9	6	15·8
	1920	5	5	1	20·0	1	20·0	3	60·0	0	0	0	0	1	20·0
	1921	9	9	3	33·3	5	55·5	1	11·1	0	0	0	0	5	55·5
	1922	14	14	6	42·9	6	42·9	1	7·1	1	7·1	1	7·1	4	33·3
	1923	21	21	6	28·6	10	47·6	4	19·0	1	4·7	0	0	9	42·9
	1924	28	28	5	17·9	13	46·4	8	28·6	0	0	1	3·6	12	42·9
	1925	30	30	6	20·0	10	33·3	12	40·0	2	6·7	8	26·7	0	0
	1926	41	41	10	24·4	10	24·4	21	51·2	0	0	11	26·8	—1	—2·3
III	1927	37	37	4	10·8	8	21·6	20	54·1	5	13·5	4	10·8	—1	—2·7
	1928	42	42	12	28·6	8	19·0	17	40·5	5	11·9	2	4·8	1	2·4
	1929(a)	26	24	4	16·7	8	33·3	12	50·0	?	?	2	8·3	6	25·0
	1929(b)	14	11	4	36·3	4	36·3	3	27·3	?	?	2	18·2	12	18·1
	1930(b)	8	8	3	37·5	1	12·5	4	50·0	0	0	0	0	1	12·5
	1930(c)	19	7	5	71·4	2	28·6	0	0	0	0	0	0	2	28·6
	1931	35	6	0	0	6	100·0	0	0	0	0	0	0	6	100·0

(a) Including births up to October 25, 1929. (b) Calves born on or after October 25, 1929, were handled under revised plan as described in text. (c) The revised plan for handling breeding bulls and cows could not become effective until

Detailed Yearly History, with Special Reference to the Natural Food Supply, which was Dependent on the Prevailing Rainfall

Sixteen of the heifers of Group I were purchased pregnant and six of them were carrying female fœtuses *in utero*, past mid-term, when transported 5,000 miles, the final 30 hours of which were passed in a furious storm at sea, so that at landing they were completely exhausted. The six female fœtuses were born at term in an apparently normal manner, were very vigorous and grew rapidly. One broke her neck at play and the remaining five constitute the 1920 lot of Group III in Table I. One heifer of Group II, arriving late in 1921, was carrying *in utero* a heifer fœtus past mid-term, which was discarded sterile. Hence, of six heifer calves living to breeding age, which were transported *in utero* when past mid-term, four failed to produce viable calves in the first breeding period and the entire four produced during their lives, together, but five viable calves of which three were bulls. Among the foundation animals there were transported *in utero* three male fœtuses past mid-term. The dams being of excellent pedigree, the bulls were retained for service. One was sold into another herd and reported inefficient, the other two made poor records in the herd.

The 17 heifers of Group I arrived in July, 1920, in the midst of a severe drought, as indicated in Chart I. It is difficult to estimate the influence of this factor, but in the exhausted condition of the heifers, the defective state of the forage could not be regarded as favourable.

TABLE I.

Total completed pregnancies to January 1, 1934.	Viable bull calves.	Per cent.	Viable heifer calves.	Per cent.	Non-viable young.	Per cent.	Average viable calves per cow.	Cows died or discarded before January 1, 1934.	Per cent.	Cows remaining in herd January 1, 1934.	Per cent.	Living cows in herd January 1, 1934, plus viable heifer calves produced.	Increase in females.	Per cent.
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
151	79	52·3	63	41·7	99	6·0	8·4	10	58·8	7	41·2	70	53	311·8
263	109	41·6	112	42·2	43	16·4	5·8	25	65·8	13	34·2	125	87	228·9
25	11	44·0	6	24·0	8	32·0	3·4	5	100·0	0	0	6	1	20·0
68	34	50·0	27	39·0	9	13·2	6·8	2	22·2	7	77·7	34	25	277·8
64	21	32·8	32	50·0	11	17·2	3·8	8	57·1	6	42·9	38	24	171·4
80	26	32·5	40	50·0	14	17·5	3·1	11	52·4	10	47·6	50	29	138·1
99	34	34·3	43	43·4	22	22·2	2·75	11	39·3	17	60·7	60	32	87·5
77	25	32·5	30	39·0	22	28·6	1·8	13	43·3	17	56·7	47	17	56·7
96	27	28·1	33	34·4	36	37·5	1·5	14	34·1	27	65·9	60	29	70·7
67	18	26·9	23	34·3	26	38·8	1·1	11	29·7	26	70·3	49	12	32·4
56	18	32·1	19	33·9	19	33·9	0·9	7	16·7	35	83·3	54	12	28·6
31	9	29·0	9	29·0	13	42·0	0·75	2	8·3	22	91·7	33	7	29·2
12	4	33·3	5	41·7	3	25·0	1·1	2	18·2	9	81·8	14	3	27·3
10	3	30·0	3	30·0	4	40·0	1·25	0	0	8	100·0	11	3	37·5
7	5	71·4	2	28·6	0	0	1·0	0	0	7	100·0	9	2	28·6
6	0	0	6	100·0	0	0	1·0	0	0	6	100·0	12	6	100·0

pregnancies produced under the revision began to terminate. This was reached June 9, 1930. When these heifers had reached breeding age two bulls grown as calves, under the revised plan were placed in service upon them.

Three of the five 1920 heifers were bred to an outstandingly fertile bull, whose fertility remained on a very high level through nine years of heavy service; 14 of the 17 viable calves produced by the five heifers were out of these three; the other two heifers were mated their first year with a bull which had been highly fertile but had broken down sexually, and together the two produced three viable calves.

Five of the 1921 lot of heifers of Group III were transported *in utero* in the first half of gestation and were born January and February, 1921, when forage was prime; the other four were conceived in January, February and March, amidst abundance of succulent forage, and were born October to December, when forage was again excellent. The contrast between the 1920 and 1921 lots of Group III is extraordinary; the latter has done extremely well, far surpassing Group II and bidding fair to equal Group I.

The precipitation in 1922 was good, but largely concentrated in the opening and closing months. Three of the 14 heifers were born in January (conceived in April, 1921, while forage remained fair) and three others, which had been conceived January to March, 1922, were born October to December, when grass was green. All six were alive January 1st, 1934, and had produced an average of 5·8 viable calves each. One heifer calf, born in February and previously mentioned as having been transported *in utero* in late pregnancy, was discarded as sterile. The remaining seven heifer calves born during the summer drought, produced 2·7 viable calves each and none of the cows remained alive January 1st, 1934.

The rainfall for 1923 was good and the breeding strength of the heifer calves born was fair,

TABLE II

Showing Number of Females in Herd of Breeding Age, for each Calendar Year, with Results

Year.	Total cows of calving age.	Total pregnancies.	Percentage pregnancies.	Percentage of pregnancies resulting in viable calves.	Total viable heifer calves.	Number first pregnancies.	Percentage viable calves.	Number 2nd to 6th pregnancies.	Percentage viable calves.	Number 7th to 12th pregnancies.	Percentage viable calves.
1920	10	10	100·0	100·0	5	10	100·0	0	0	0	0
1921	23	23	100·0	95·7	2	13	100·0	10	90	0	0
1922	42	40	95·2	82·5	14	18	66·7	22	95·4	0	0
1923	65	62	95·4	80·6	21	25	69·6	39	87·2	0	0
1924	70	61	86·2	93·5	28	9	88·9	52	94·2	0	0
1925	80	77	96·2	87·0	30	14	78·6	63	88·9	0	0
1926	110	90	80·2	87·8	41	16	87·5	68	88·2	6	100·0
1927	133	83	62·4	85·5	37	19	68·4	58	91·4	9	88·9
1928	160	132	82·5	80·3	42	34	64·7	74	83·8	24	91·7
1929	192	124	64·6	59·7	40	33	42·5	58	63·8	33	69·7
1930	203	81	40·0	65·4	27	28	46·4	36	77·8	17	70·6
1931	214	122	57·0	72·1	31	46	50·0	53	84·9	23	87·0
1932	226	113	50·0	66·4	43	40	52·5	56	73·2	17	76·5
1933	234	89	38·0*	89·9	43	19	84·2	65	90·8	4	100·0

* The ratio of conceptions after March 20, 1932, was very low because of the extreme drought; during October to November, 1932, breeding was suspended; the births of 1933 were largely massed in the last quarter, due to breedings in the first quarter, with abundant forage.

The total number of viable calves (Table II) had reached 62 and the ill-effects of mass feeding upon the health of the calves had apparently begun.

The precipitation for 1924 dropped to one-half of that of 1923. Of the 28 viable heifer calves born, ten produced non-viable young in the first breeding period and one cow died. The non-viable young were generally expelled or extracted at 255 to 301 days. The 15 heifer calves born January to April inclusive, produced 12 viable calves during their first breeding period, of which ten were heifers. Collectively they have produced 3·2 calves each. The other 13, calving later, produced six viable calves in the first period and a total of 2·2 calves each.

The 1925 rainfall was extremely low. The 30 viable heifer calves produced began and completed their intra-uterine life, and their milk-feeding period, in a continuous drought, 47 per cent. failed to produce living young in their first breeding period, ten cows died and ten viable heifer calves were born. Six of the lot were in critical dystocia at the close of first pregnancy, of which three succumbed. On January 1st, 1934, the youngest cow had passed eight years of age, and the entire group, originally of 30 breeding females, had produced a total of 30 heifer calves.

In 1926 the precipitation was still lower; in their first breeding period the 41 heifers born in 1926 produced ten viable heifer calves and eleven of the cows had died or been discarded. Two years of severe drought had depressed the vitality of all animals of both sexes; more copulations were required of the weakened bulls and this only accelerated the difficulties.

The conceptions for the 1927 births were evenly distributed from March 20th, 1926 to March 30th, 1927. The first 21 heifer calves were conceived during the 1926 drought; in first pregnancy they produced eight viable, and 13 non-viable young; the last 20 heifer calves, conceived and born when forage was good, produced twelve viable, and eight non-viable young in first breeding period.

The rainfall was good in 1928, but the barriers to healthy reproduction had so accumulated that it became difficult clearly to trace the various interferences and accurately measure their influence. The total number of young had reached its maximum (Table II), and the accuracy of feeding and handling calves reached its lowest level and the health of the calves declined. The vitality of the herd bulls continually dropped and new sires, which like the females had been in poor health as young calves, were brought in to aid in supplying the services demanded. The herd was nearing a crisis. As shown in Table I, there were some indications of a favourable response to the improved rainfall.

The climax was reached in 1929: the tardy conceptions, the unsafe pregnancies, the prevalence of dystocia, retained afterbirth and other serious genital diseases had caused a large accumulation of heifers and cows of very low fertility; the foundation cows were approaching senility; the vitality of the bulls was low; the calves were small and weak at birth and their health during the milk-feeding period was extremely unsatisfactory.

At the middle of the year I became resident veterinarian and devoted my entire time for one year to the breeding problem in the one herd.

Investigations into Causes of Breeding Inefficiency in the Dairy Herd: Clinical Findings

Breeding was wholly suspended pending a careful survey; detailed examinations were made of the genital organs of all animals of breeding age of both sexes, including a study of the morphology of the spermatozoa of bulls; the condition and the method of feeding and handling the calves were carefully observed; the numerous cases of dystocia, retained afterbirth, metritis and other diseases of the puerperal period were given constant attention. The breeding history of each animal was scrutinised. After four months of observation it was believed that sufficient information was at hand to justify certain conclusions regarding the cause of the difficulties and to formulate plans by which the breeding health of the herd might be improved. The observations showed:—

(1) Most heifers eventually became recognisably pregnant but conception was extremely tardy in a majority of them. The records seemed to indicate infrequent and irregular œstrum. This appearance may have been due in part to early death of embryos and their unobserved disappearance; the environment was unfavourable for the observation of the expulsion of embryos before 150 days. Some œstral periods were naturally overlooked. It appeared, however, that there was a basic infrequency of œstrum referable in part to arrest in development of the genital organs as young calves, accentuated during periods of drought by lowered vigour.

Many of the heifers showed definite hypoplasia of the vulva and vagina; it was impracticable in the case of many large, three-year-old heifers to pass the hand through the vulva. This feature was not confined to non-pregnant heifers but included those in advanced pregnancy. The vulva of some large, non-pregnant heifers would admit of the insertion of but one or two fingers without the use of definite force. Rectal palpation revealed ovaries subnormal in size and small uteri of deficient tone. These phenomena were not unique, since isolated cases are observed by all clinicians with experience in sterility among dairy cows; the significance here lay in the general prevalence of the arrested development, which suggests an explanation for the solitary cases in ordinary practice.

(2) As indicated in Table I, there was a high prevalence of non-viable young. According to current definitions of *abortion* that phenomenon was not highly prevalent. A majority of the non-viable young were carried 240 to 300 days or over. In numerous cases the fœtus was alive at the onset of labour; almost all were fresh when expelled or removed. Many of them had suffered from fœtal diarrhœa.

(3) Dystocia was extremely common in primiparæ and constantly associated with extremely narrow vulva and vagina. The dystocia was extremely difficult to overcome, requiring several hours of patient effort. The pelvis appeared small, but its size did not come into prominence because it was almost impossible to dilate the vulva and vagina to the dimensions of the pelvis; had the pelvis been ever so capacious the dystocia would not have been altered. In fact, the pelvis, in ordinary labour, conserves the integrity of the soft parts by retarding the advancement of the fœtus until the passage is fully dilated. In several of these heifers, when delivery was attempted by laymen, the soft parts were so extensively ruptured that death followed immediately from hæmorrhage; two heifers survived complete rupture of the perineum and again conceived. Embryotomy or Cæsarian section might have been technically successful, but as they are powerless to cure or alleviate the basic hypoplasia, the animal would be worth no more in the end than those which died from rupture. Neither were my patient efforts at extraction markedly successful—some had extensive necrotic vaginitis; most of them had obstinate retention of the afterbirth.

All veterinary obstetricians of experience encounter cases of this type, but, being solitary, their significance is not realised.* Veterinary obstetricians describe these cases as *relatively* or *absolutely* too large a fœtus, advise forced extraction, embryotomy or Cæsarian section, and compute the results upon the survival of the cow, not upon her breeding value.

* This herd is not a solitary example of a high ratio of dystocia in primiparæ due to genital hypoplasia. Miller and Graves, in *Tech. Bul.* 321, *Bureau Dairy Industry, U.S. Dept. Agriculture*, record 198 first pregnancies, with 65 non-viable young, of which they class 43·1 per cent. as "dead calves" and 56·9 per cent. as "abortions"; and state: "The increase in percentage of calves born dead can be partly explained by the fact that a number of heifers in the *abortion-negative* group had genital tracts which were too small to deliver live calves." They fail to state the cause of the hypoplasia.

(4) Among 14 of the heifers attended personally in dystocia, five had definite dropsy of the amnion and allantois; this ratio is apparently representative throughout. The amniotic content was usually mucoid, thick and ropy. In some the allantois was sclerotic and required surgical rupture.

(5) Puerperal hæmorrhage, not dependent upon laceration, was common. The blood coagulated in the uterine cavity and was not inclined to putrid decomposition; it behaved like the intra-placental hæmorrhage of bovine fœtal mummification. Non-putrid disintegration of the blood occurred and the milk was pale red until the blood had been removed from the uterine cavity.

(6) Extreme delay in the first conception was associated with correspondingly marked genital hypoplasia. When pregnancy finally terminated it was found that the mammary glands were included in the hypoplasia and the cow was worthless for dairying.

(7) The calves were weak at birth, unhealthy throughout the milk-feeding period and grew very slowly, as already indicated (page 52).

(8) The reproductive organs of the bulls offered no unusual anatomic lesions. The morphology of the spermatozoa was generally fair; never excellent.

No one of the phenomena mentioned, or any other observed, is specifically new to experienced clinicians. Any significance they may possess resides in the mass of the data, the size of the herd, the detailed breeding history available, the accurate knowledge of the nutritive supply at every step, the changes in handling at various times, and, of very great value, the availability of a contact herd of twenty-five thousand beef cattle, with more than five thousand calves born annually, serving as a *control* group for comparison.

Diagnosis: Dystrophia of Genital System Resulting from Adverse Influences upon Animals during Intra-Uterine and Early Extra-Uterine Life.

It was concluded that the breeding difficulties constituted an endless chain, involving the entire reproductive cycle, and that the diseases of the fœtus and of the young calf were the two most important links, about which control measures should revolve.

The most outstanding phenomenon was the genital hypoplasia or juvenile reproductive organs—a phenomenon not explained in veterinary literature. The embryologist discusses the laying down of the outlines of the reproductive system and follows the evolution to sex differentiation. The subject is resumed by the anatomist and physiologist when ovulation and spermatogenesis begin. In a small way I have recorded the observation, while describing a series of monsters, that there was commonly an arrest in the evolution of the reproductive system which appeared to be secondary to an aberration in development in some other system. The chief arrests were in the non-descent of the testes and in persistent hymen.

All systems of organs, except those of reproduction, actively function during fœtal life or are fully prepared to function accurately at the moment of cessation of the placental circulation. It is not essential that the reproductive system be fully evolved until breeding age, a function not usually begun until the bony skeleton and other systems of organs have attained adult size. Through breeding and feeding, the dairyman has enormously abbreviated the interval between birth and sex maturity in dairy cattle, so that at about the close of the milk-feeding period, although the calf may not be one-fourth the adult size, the heifer ovulates and the bull forms spermatozoa. In the dairy herd under study it appears clear that the vigour of the young calves was so low that the evolution of the other systems of the body and of the reproductive systems could not be simultaneously maintained and, accordingly, those organs essential to the life of the individual took precedence over the reproductive system. As a consequence, the young animals arrived at the age of sexual activity with juvenile genital organs—a condition for which no remedy is known.

Probable Causes of the Genital Dystrophia in the Dairy Herd and the Preventive Measures Outlined for Adoption in the Herd

The most pressing problem appeared to be the determination of the cause of, and the remedy for the prevalent genital hypoplasia; a problem which constituted an uncharted sea. The arrested development could not be dependent upon some powerful contagion, or it would have involved alike all lots of animals in the dairy herd and would inevitably have invaded the twenty-five thousand contiguous Herefords; it was not due to quantitative starvation, because they had an ample supply of milk and forage, fully equal to that enjoyed by the vast control herd; it could not be attributed to the absence of minerals, proteins, vitamins or other essential food elements, or again the Herefords would suffer equally. Yet the dairy calves were in the discouraging health described, while the condition of the beef calves was virtually ideal.

It was concluded that the contrast in the breeding efficiency of the two herds was due to some vital error or errors in the breeding and handling of the dairy animals, chiefly during the milk-feeding period of the calves, and that the chief improvement must be made here, without neglecting in the least other

measures to be applied to animals of all ages. The problem was to be handled as an endless chain of disease involving the entire cycle of reproduction. The method was to be *intrinsic*, the aim being to control the injurious factors within the herd and within the individual itself and leave for future consideration *extrinsic* means of erecting barriers against the invasion of disease from the contiguous healthy herd or of the transmission of disease from one animal within the herd to its associates. The chief points in the plan were:—

1. Animals of both sexes deemed sterile were discarded.

2. Instead of breeding heifers at 15 to 18 months of age, the first breeding was deferred to two years. Heifers grown exclusively on forage do not mature as early as those fed heavily upon grain. Moreover, available data, covering the entire breeding life, seem to indicate that dairy heifers are commonly bred too young for the greatest longevity and the maximum of healthy calves. Thus in Group I of Table I, three of the heifers were bred to first calve after they had attained three years of age; they have produced 29 viable calves, omitting from computation one twin. They have produced no non-viable young, and two of the cows remained in the herd January 1st, 1934. The other 14 of the group were bred to calve before three years of age, have averaged 8·1 calves each, have supplied all aborts and stillbirths for the group, and but five of the 14 are alive.

3. Each cow was given careful attention at the close of pregnancy and any disease handled energetically. It was assumed that each cow, regardless of apparent health, was liable to develop disease; the uterine contents were siphoned out for inspection and iodoform and oil introduced into the apex of the gravid horn as a safety measure. The burden upon the cows was reduced by allowing a minimum rest of six months after the close of one gestation before beginning the next.

These measures were designed to reduce the abortion and still-birth ratio and assure healthier calves although it would reduce the maximum number of pregnancies. It was not expected that such measures would either create or restore fertility in the large number of cows which had come to breeding age with juvenile genital organs and had suffered further damage from dystocia, dropsy of the amnion and allantois, retained afterbirth, metritis and vaginitis, but it was hoped to conserve to some extent the remaining reproductive strength. Little more was to be expected of the foundation cows, already ten to 14 years old. The aim was to maintain the established milk production and to produce an ample number of healthy calves to replace the present herd. This has been accomplished.

4. The calves were left with their dams for twelve to 24 hours after birth, at which time they were placed in individual portable pens, 6 ft. by 8 ft., consisting of a light wooden frame, covered with poultry wire. A removable top, partly covering the pen, was provided as a protection from sun and rain, and to this top was attached a shield which could be lowered on the windward side of the pen. Each pen was moved daily to new ground from which all long, coarse or dead weeds or grass, and any rubbish had been removed. The used ground was left for a month to sun, wind and rain for cleansing. Accurate feeding was assured, calf-sucking was prohibited, and the swallowing of rubbish prevented. Most important, all alimentary excretions were in plain view and could be readily observed for signs of impending disease.

After twelve or more hours in the pen, the calf received as its first meal, one pint each of milk and of limewater and four ounces castor oil. It was assumed that the castor oil would cause moderate purgation, but this was apparently an error, and neither purgative nor laxative effect was observed, perhaps owing to the combination in which it was fed. The oil was omitted after the first feed and the amount of milk and limewater continued twice daily for one week. At the end of this period the limewater was gradually withdrawn and the amount of milk cautiously increased. It was provided, however, that in the event of blood streaks in the fæces (the most reliable sign observed of impending diarrhœa) or of diarrhœa itself, of sticky fæces, tympany or other digestive disturbance, the current milk ration was to be immediately withdrawn and the initial feed of castor oil, limewater and milk substituted. At the end of one month the calves were removed from the portable pen and given freedom in a second enclosure, where they were fed in stanchions set in a cement platform readily washed. They were kept secured in the stanchions until their muzzles were well freed of milk, which largely prevented their sucking each other. When three months of age they were moved to another enclosure, also furnished with stanchions, where they were allowed plenty of separated milk, in addition to ample forage. At six months the heifers were removed to a large enclosure, with the general heifer herd, where they remained wholly dependent upon grazing until the close of first pregnancy.

The Beneficial Results soon Evident after the Adoption of the Changed Methods of Maintenance and Rearing

Simultaneously with the changes in the method of feeding and handling of the calves there was a decisive and highly gratifying improvement in their health and vigour. Under the old milk ration of 4 to 5 lb. milk twice daily, their growth was almost imperceptible, but when reduced to 1 lb. their growth was rapid. It had been assumed that in the state of their health at birth, they were incompetent to digest and assimilate the amount which had previously been fed and that by reducing the volume they would be enabled to use it profitably; it was expected they would lose some flesh and become gaunt, but this proved erroneous. Digestive disturbances disappeared almost entirely and the hair retained a brilliant lustre. The heifers were larger at breeding age than those of a year older grown under the old plan and the arrest in the development of the reproductive system seems to have ceased.

The two lots of heifer calves designated in Table I as 1929 (*b*) and 1930 (*b*) were already *in utero* when the plan was put in operation; the conceptions had occurred prior to the discarding of the least desirable sires and the genital organs of the cows had not been examined. Through some oversight, half of them were bred before two years old. With the 1930 (*c*) lot of heifer calves, the revised plan came into full operation. When they reached breeding age, two bulls grown with them under the new plan were mated with them. Since that time 13 heifers have terminated their first pregnancies with 13 viable calves without dystocia or retained afterbirth. Apart from Group I, Table I, this constitutes the longest unbroken series of apparently normal calvings by heifers during the 13·5 years of the existence of the herd.

The number of dairy animals involved; the duration of time covered; the permanency of the females in the herd from birth to the close of breeding life; the accuracy with which the breeding animals are separable into distinct groups; the response of each group to authentically known variations in food and handling; and, finally, the vast herd of healthy Herefords in immediate contact, with which accurate comparisons are freely available, unite in rendering these studies of unusual clinical interest. A study of Chart I, detailing the rainfall, which controls the character of nutrition, fixes the state of health of the fœtuses *in utero* and of the young calves. Table I shows constant harmony between the health of the fœtus and of the young calf, and of the duration and efficiency of its sexual life. Admittedly, however healthy the young calf may be, disease may invade the adult and depress or destroy the breeding life of a healthy cow, but, if the observations here recorded mean anything at all, the maximum of breeding efficiency is already fixed when a heifer first ovulates: if ideally healthy at that time, only very serious disease forces can endanger her reproductive efficiency.

Throughout Table I, the breeding efficiency during the first pregnancy of each group of heifers provides a reliable forecast of the reproductive strength of the lot throughout its existence. If the first pregnancy is heavily beset with disaster, the average breeding life of the group is brief and the average number of viable calves per cow is low. Individuals may, and do rally after abortion, dystocia, retained after-birth or other disaster, but these instances do not overthrow the principle involved.

Summary

In the report presented, the questions of the bacteriology, pathology and therapeutics of the diseases of young animals have been passed over and the discussion confined to recording clinical observations upon the ultimate influence of ante-natal, and early post-natal health upon their vigour and breeding efficiency as adults.

The observations, covering 14 years, were made in a large, pure-bred herd of dairy cattle, intimately surrounded upon all sides by an unusually large herd of very healthy beef cattle, which serve as a highly efficient control group. Located within the tropics, both herds are permanently out of doors and are dependent upon natural grazing for sustenance. The quality and quantity of forage is wholly dependent upon the precipitation, concerning which authentic information is available, the rainfall being recorded upon the dairy premises, as indicated in Chart I.

It is assumed that bacteria were present in abortions, still-births, retained afterbirths, etc., and it is not assumed that protozoa and filterable viruses were absent. The 60 foundation animals, drawn from eight large dairy herds, were presumed to have carried into the new herd the prevalent infections of dairy herds, and the intimacy of contact with the enveloping beef herd was such as to justify the inference that any highly transmissible genital infection existing in either herd would involve the other.

The omission of bacteriological search is in no sense any reflection upon its value; the environment was not favourable for such study. The observations were directed to the quantity and quality of food, the methods of feeding and breeding and to such other factors as might act upon the general health, and thereby modify the natural resistance of the animals to the invasion of contagion.

By far the most outstanding phenomenon observed was the general prevalence of genital hypoplasia, which was attributed to faulty nutrition from birth up to sex maturity. While the most spectacular phenomenon of the genital hypoplasia was the juvenile vulva, which served as a barrier to parturition, it appeared that the hypoplasia was not confined in its effects to dystocia but involved, as well, the readiness of conception, the safety of gestation and other phenomena attributable to a weak genital system, and included the bulls as well as the females in widespread sexual weakness.

When the observations had reached a point where they apparently justified the introduction of possibly permanent control measures, instead of resorting to isolation, quarantine, disinfection or artificial immunisation, it was decided to make an effort to build up the natural powers of resistance in all animals, with the calves as the most important link. It was reasoned that in the herd concerned, the natural resistance constituted the chief factor, otherwise the contiguous beef herd would suffer

like damage. The way was left freely open for the later resort to quarantine, disinfection or artificial immunisation in case of need.

It is shown in Table I and Chart I that the fertility of heifer calves, when they reached breeding age, rose and fell parallel with the rainfall, which dictated the quality and quantity of food to their dams while they were *in utero*, and to themselves in calfhood. Later it is indicated that with changes in the handling and feeding of the young calves, their fertility as adults advanced despite unfavourable food supply during their intra-uterine and early post-natal life.

In Table I it is shown that with each group of heifers, those which did well in their first breeding period continued to be efficient over a long period of years, while those which did badly in their first breeding period were short-lived and inefficient. These observations are in direct conflict with the dogma that abortion or other pathologic phenomenon of reproduction benefits the breeding female through inducing a valuable immunity. The observations of Williams, Udall, Frost and others (*Cornell Veterinarian*, October, 1924) showed that abortion and related pathologies are regularly associated with utero-chorionic lesions and that those of the uterus are permanent, hence no remedy can eliminate the scar.

A further highly interesting observation is that in those groups in Table I, in which the breeding efficiency was high, the ratio of male to female young was low, while conversely, in groups of low breeding efficiency, the ratio of males to females was high.

No conclusions are submitted. It is believed that observations are more valuable than theories.

Since December 31st, 1933, at which date the observations recorded terminated, there have become available the breeding data for the five months from January to May, 1934, inclusive. Forty-six pregnancies have terminated with 40 viable and six non-viable young. There were no abortions, as that designation is ordinarily used, the duration of intra-uterine life of the dead fœtuses ranging from 275 to 286 days, with an average of 281·3 days as compared with 282·1 days for the 40 viable calves. There were 20 male pregnancies with 75 per cent. viable calves, and 26 female gestations with 96·6 per cent. viable calves. The sex ratio of all pregnancies was 77 males to 100 females; for viable calves the ratio was 60 males to 100 females, and for dead fœtuses it was 500 males to 100 females.

The number of viable heifer calves born during the first five months of 1934 equals the number of live heifer calves born during the first five months of 1932 and 1933 combined.

ELECTRICITY FOR THE SLAUGHTER OF POULTRY

D. J. ANTHONY

Electricity for the humane slaughtering of the larger food animals is now an accepted method in this and other countries, and much has been written in veterinary literature regarding it, but so far the use of the electric current for the humane slaughtering of poultry has received very little attention.

There appears to be no reason whatsoever why poultry should not receive a humane death, and the purpose of this short article is to show how the methods at present in use for the slaughtering of pigs, calves, and sheep can equally well be adapted for stunning poultry, especially the larger birds such as turkeys.

At Christmas time it is the custom in large meat factories for numbers of turkeys to be slaughtered, and since the adoption of the "Electrolethaler" method for stunning purposes, attempts have been made to stun turkeys prior to bleeding, with marked success.

The appliance used is the same as is in regular use for the stunning of pigs, sheep and calves, except that the electrodes at the end of the "tongs" are brought closer together, owing to the smaller size of the bird's head. The only other differences are in the method of applying the electrodes to the bird's head, and the time during which the current is switched on.

Method of Application

The bird is caught and carried into the slaughtering hall, out of sight of its fellows. An attendant grasps the bird firmly under one arm, the other hand firmly gripping the bird's neck just below the head. The "Electrolethaller" operator places the wet tongs in positoin, one electrode on the bird's poll and the other beneath the inferior maxilla (*i.e.*, in a dorso-ventral position). This method of applying the tongs differs from that customary for stunning larger animals, where the electrodes are applied on either side of the head, the brain being in line with the current. This "lateral" position cannot be employed with turkeys without the possibility of pressing on the eyes, and to avoid that the dorso-ventral position is used. This is equally effective, as the brain is still in line with the current.

The current is switched on, and applied for a short period of from one to three seconds only, after which it is switched off, the tongs removed, and the bird is bled by severing the lingual artery.

Effects of the Electric Current

The first and most noticeable effect is the change of colour of the comb and wattle; the red colour vanishes and the comb and wattle

become white and anæmic in appearance. When the current is switched on the same muscular contraction is noticed as is the case in pigs and other animals. On switching off the change of colour in the comb and wattle is most marked; there is muscular relaxation, and the birds bleed well—much better than by the old-fashioned method of wringing the neck and then bleeding.

The corneal reflex is absent and, as in the case of sheep and pigs, etc., there is some reflex movement whilst the bird is bleeding. I should say that the birds are hung head downwards to bleed.

As numbers of butchers, at Christmas time especially, slaughter large numbers of poultry, and as the electric stunner is often available, there seems to be no reason why it should not be used for the humane stunning of poultry. Whilst the ordinary pig-stunning tongs can be modified for this purpose, there is no doubt that the various electric stunning instrument-makers could easily turn out a cheap tongs of a size suitable for poultry stunning, and thus help to bring the slaughtering of poultry in line with recent advances in the stunning of the larger food-animals.

SHIRE HORSE SOCIETY

At a Meeting of the Council of the Shire Horse Society recently held at 12, Hanover Square, W., satisfaction was expressed at the number of entries received for the 56th Shire Horse Show which takes place at the Royal Agricultural Hall on Tuesday, Wednesday and Thursday, January 29th, 30th and 31st. The actual entry is 195 as compared with 204 last year, and 193 in 1933.

His Majesty the King again heads the list of exhibitors, which also includes such famous breeders as the Duke of Bedford, the Duke of Devonshire, Sir Gomer Berry, Sir Bernard Greenwell, Sir Ernest Wills, J. Morris Belcher, James Forshaw & Sons, and W. J. Cumber. Among the more prominent users of Shires represented are the Liverpool Corporation, Messrs. Mann, Crossman & Paulin, Ltd., and Messrs. Young & Co.'s Brewery.

The programme was arranged as under:—

Tuesday, January 29th.—Judging of stallions and geldings, commencing at 10 a.m.

Wednesday, January 30th.—Judging of mares and produce groups, commencing at 10 a.m. Judging of Championships at about 3 p.m., followed by a Parade of Prize-winners. Annual General Meeting of Members at 4.15 p.m.

Thursday, January 31st.—Parade of stallions, mares and geldings entered for the auction sale at 10 a.m., followed by the sale at 11 a.m. Judging of commercial horse classes at 2 p.m.

Arrangements were made for the provision of the usual comprehensive classification for Shires at the 1935 Royal Show, at Newcastle-on-Tyne.

On the recommendation of the Selection Committee, the Council agreed to recommend to the Annual General Meeting of Members that Mr. Christopher Barker of Stilton House, Helmsley, Yorks, and Oakhyrst Grange, Caterham-on-the-Hill, Surrey, be elected President-Elect, *i.e.*, President in 1936.

The Veterinary Record

January 19th, 1935.

BOVINE STERILITY: MODERN VIEWS ON ITS CAUSATION

We print in this issue an article—which, we feel, will attract widespread interest—by a doyen in veterinary teaching, Professor W. L. Williams, who through his text-books and numerous other writings has gained a well merited and world-wide repute as a leading clinical authority, of unrivalled experience, in the subject, namely, the diseases of the bovine reproductive system, to our knowledge on which he makes a further valuable original contribution in his paper.

The article is concerned with an investigation into the causes of serious breeding troubles that beset a herd of Holstein-Friesians built up within a much larger herd of Herefords in a sub-tropical district in Southern U.S.A., where the animals subsisted entirely upon the natural local forage, the quality and abundance of which depended upon the prevailing rainfall, which again was accurately recorded throughout the period of the investigations. The animals of the beef breed remained healthy during this time, although they were exposed to close contact with the dairy animals, so that they had every chance of contracting infectious disease if this was responsible for the troubles. After careful clinical examination, it was found that the most striking abnormality in the dairy cows was widespread dystrophia of the reproductive system, manifested prominently by a hypoplasia of the genital tract at breeding age.

This class of under-development, it is admitted, is not new to our cattle practitioners, but its occurrence on such a large scale, amounting to a veritable outbreak, in conditions in which its origins could be traced with fair certitude from the circumstance that it did not arise in what may be regarded as the large number of control animals, namely, the Herefords, is possibly unique. The favourable opportunity for a profitable enquiry was not missed. The measures—then taken—which were based on deductions made upon purely clinical observation—quickly, it seemed, brought the troubles to an end.

Some of the statements made in the course of the paper will not, we think, entirely escape

criticism. Laboratory workers will probably scent in the histories recounted the depredations caused by familiar groups of bacteria—Salmonella, Pasteurella, Brucella, and probably Corynebacteria. They may also perhaps fail to keep patience with Professor Williams in what they may regard as his stubborn unwillingness to admit that contagious abortion in cattle is commonly a specific bacterial infection—as specific, shall we say, as anthrax or glanders. Again, nutritionists may not agree with him when he says that the disturbances in the dairy herd could not be put to the count of insufficiency of certain food essentials: comparison with the animals of the beef breed would not be fair, it might be held, on account of the heavier drain on these substances made on the bodies of high-yielding lactating cows.

Even so, we cannot but feel that Professor Williams has rendered a great service to the furtherance of our knowledge upon a pressing problem affecting particularly the dairy industry. Nearly two years ago (April 26th, 1933), a full dress debate upon Sterility was staged at a meeting of the Comparative Section of the Royal Society of Medicine, and it may not be irrelevant here to quote the conclusions arrived at by the speaker who reviewed the rôle of infectious disease in causing sterility. After analysing the views held until then by the various schools of thought he continued (*Proceedings*, 1933, p. 1196) :—

"On the other hand, the principles which Williams lays down in the summary given at the close of his recently published lectures (1932), while giving no flagrant offence against the codes of orthodox bacteriology, embody a number of statements which seem to be in harmony with the findings of the several kinds of specialist workers upon the phenomena of reproduction. He maintains that no stage in the life history of the individual is free from danger to the function of reproduction, and to obtain the highest degree of fertility, the new-born animal, of either sex, must be kept in the highest state of health during the developmental period of its reproductive system. Certain points in the breeding life are especially vulnerable, notably, the young animal should not be put to the strain of early breeding, and the significance of bad food, inclement weather, and other 'stresses' should be kept in mind. Bad sexual hygiene, of the kind indicated, is the primary cause of sterility; infection is ever-present, but its rôle is secondary. The lowered resistance to infection may be transmitted to the succeeding generation."

The reports forthcoming from the Conferences of the German Veterinary Specialists on the Diseases incident to Stockbreeding also put increasingly more stress upon the influence of factors which result in under-development or dysfunction of the reproductive system rather than upon infection as the primary cause of most cases of sterility. The intensive laboratory research which is now being carried out into the manifold aspects of nutrition and endocrine action has brought out the paramount importance for its future development of an adequate supply of food essentials to the young animal during its intra-uterine and early extra-uterine life. Hence, although the bacteriologists may rightly claim to have in their hands the proper means to set about the control of many of the important diseases afflicting our livestock, Professor Williams, through shrewd clinical sense and assiduous field observation, may well be on the right track for exploring profitably a problem which perhaps belongs (though by no means always, as is already well-known), to a different category—a category to which belong also milk fever, rickets, certain anæmias, and other diseases that have been floodlit so powerfully by the researches of the last few years.

We commend our readers to the information collected in the recently published Report of the Committee on Cattle Diseases of the Economic Advisory Council, according to which (p. 11) disease accounts for over one-half (58·2 per cent.) of the annual wastage among dairy cows, and sterility exacts almost one-half (23·8 per cent. of the total wastage) of the gross toll levied by disease. It is a matter for some searching of heart that not one of the enquiries into this class of wastage was conducted by veterinary workers, and also, in view of the great loss suffered by the agricultural industry through sterility, that this subject is not given prominence on the programme of any of our veterinary research institutes. In the recently published report of the Agricultural Research Council sterility does not figure as an item entrusted to any of its numerous sub-committees. It may be that whereas breeding troubles, for purely economic reasons, loom so largely in the mind of the practical dairy man and his veterinary practitioner, researches promoted with an end to increase fertility have perhaps not made an appeal to the distinguished medical men who give their services on this Council for the welfare of agriculture, sorely exercised as some of the leading men in their profession now seem to be with an aspect of the problem which may be looked upon as almost an opposite one to the above from the practical standpoint, namely the sociologic one, how best in the human species to control over-population.

THE ATTESTATION OF DAIRY HERDS

ON Saturday the twelfth instant, the Ministry of Agriculture issued particulars of arrangements for England and Wales under Section 9 of the Milk Act, 1934, to promote the establishment of so-called "Attested Herds," *i.e.*, herds free from tuberculosis. The scheme will come into operation on February 1st next, and it is a voluntary one. One of the advantages that will accrue to the owner of an Attested Herd will be that he will receive a bonus of one penny per gallon for all milk from his herd, sold under the Milk Provisions of the Milk Marketing Board. This bonus will be in addition to any advantages which he may later receive under the Accredited Producers' Scheme of this Board.

The owner of cattle who has taken steps to eradicate tuberculosis from his herd and who is a "Registered Producer" under the Milk Marketing Scheme can apply to the Ministry of Agriculture for an official test of his herd. In making his application, the owner must satisfy the Ministry that he has undertaken two consecutive tests, on his own behalf, upon the herd, and these tests have been performed at an interval of not less than six and not more than twelve months prior to the date of application. Further, he must satisfy the Ministry in regard to the conditions under which the herd is maintained, and agree to observe the rules that will apply to an Attested Herd. Thereupon an official tuberculin test will be carried out upon all the animals of the herd by the Ministry, free of charge. If no reactors are then found, the Ministry will issue a Certificate of Attestation in respect of the herd, and the herd will then be added to a Register of Attested Herds to be kept and published by the Ministry.

It is gratifying to note that the Ministry have envisaged what must be regarded as a necessary condition for the success of any scheme of this kind, namely, adequate monetary inducement to the owner to begin taking steps towards eradication.

Perhaps some of our readers would have wished that the scheme should have been obligatory from the outset, at any rate as applied to certain areas that are essentially dairy areas; but, in view of the enormous expenditure which such steps would entail, the Ministry have no doubt been wisely guided in determining upon a voluntary scheme for trial in the first place.

The scheme, as promulgated, cannot be regarded by the majority of the profession as that best suited for a long term policy covering the ground considered by the Hopkins Committee, but it may be hoped that within a comparatively short time steps will be taken to develop the scheme along the lines suggested by the agreed scheme adopted by the Council of the N.V.M.A. at its recent meeting. This latter scheme, to which we shall be giving publication shortly, is the outcome of lengthy deliberation by a large committee comprising representation of all branches of the profession, and will, we hope, commend itself to all our readers.

Clinical Communication

SOME REMARKS ON THE CLINICAL ASPECT OF CHRONIC TRACHEO-BRONCHITIS OF THE DOG DUE TO *OSLERUS OSLERI* (COBBOLD, 1879)

A. W. NOEL PILLERS, F.R.C.V.S., F.R.S.E.

Hare (1930) summarised 16 known cases of the above disease. He did not include those discovered by Gaiger in foxhounds in India, although he mentioned them in the text. Since my note (1928) I have received from Mr. W. R. McKinna, M.R.C.V.S., D.V.S.M., further interesting material and data. In February, 1934, he forwarded the trachea and bronchi of a Cairn terrier which when alive showed signs of pharyngitis and bronchitis, was treated, and apparently made a good recovery. Later colitis occurred, and as there was marked loss of condition the animal was destroyed. The trachea and bronchi contained numerous wart-like outgrowths from a pin's head to a hemp seed in size. One of the small growths was only a couple of rings distant from the cricoid cartilage. Several of them contained the nematode *Oslerus osleri*. In the following May I received a note to the effect that another Cairn terrier dog from the same kennel, but now in a different home, was showing symptoms very suggestive of infestation with this worm, and an offer was made that I might, if I so desired, make a bronchoscopic examination. I had suggested the latter in a previous article (1928) and Mönnig (1934) has since done the same.

The dog was born on March 21st, 1933, and remained in the same kennel until September, when it was bought by the present owner. In March, 1934, spasmodic coughing developed and persisted until the dog was sent for examination on May 16th. A puppy from the same kennel had been destroyed elsewhere after being sold, owing to an incurable spasmodic cough, and the veterinary surgeon who conducted the *post-mortem* examination reported that its air passages were filled with warty growths. I regard this animal

as having been infested with *Oslerus*, as I know no other condition which can be so described. This account therefore adds three more cases, one alive and two from *post-mortem* records, to Hare's list of 16 and the indefinite number (probably several and at least one) mentioned by Gaiger, making a total of 20 or more recorded cases.

On examination soon after arrival, the dog showed no symptoms when at rest, although there was a slight rasping sound on auscultation over the termination of the trachea. There was hardly any cough save when the patient was exercised, it persisted for a few minutes only, and the rasping sound in the trachea was increased somewhat. The temperature was normal. Microscopic examination of swabs from the nostrils and back of the throat were negative on all of several occasions. On May 17th, the fæces showed a large number of smooth-shelled ascarid eggs (*Toxascaris leonina*) in each cover-glass preparation, and on June 5th, in addition to these 15 larvæ were found. These, on comparison, appeared very similar to those from a female *Oslerus osleri*. The animal was not treated for the alimentary nematodes until later. On June 6th, after fasting and a ¾ grain dose of morphine hydrochloride subcutaneously, the patient was put on the table and given A.C.E. mixture. After a few strokes of the bellows his breathing became so shallow as to be hardly perceptible. The bronchoscopic examination was therefore proceeded with, in the dorsal position without further anæsthesia. Mr. J. E. G. McGibbon, M.B., B.S., D.L.O., passed the bronchoscope into the right and left bronchi. A good view of the worm nodules in each bronchus was obtained. It was only possible to see the first nodule, and part of the one behind it in each case, because the bronchoscope could not be passed beyond these points without causing damage. Portions of two nodules were removed by means of the bronchoscopic forceps. Each showed living *Oslerus osleri* on microscopic examination. The hæmorrhage was comparatively trivial, and in a few days the abnormal bark returned. After the successful diagnosis, an electro-cautery was designed by Mr. McGibbon so that the nodules might be pierced at a later date with a view to destroying them. On June 17th, a capsule containing 1 c.c. of tetrachlorethylene was given after fasting, and the ascaris egg count dropped on June 25th, to about one-third of the original. The treatment was repeated on July 3rd, and after July 9th, ascaris eggs could be no longer detected in the fæces. The animal was kept in a loose box, the fæces were removed often, and general cleanliness was observed. An occasional antiseptic bath was given.

On July 23rd, after morphinisation, Mr. McGibbon again passed the bronchoscope. The condition of the bronchi seemed much the same as on June 6th. It was intended to pierce the accessible nodules with the electro-cautery after having removed a further portion for study. Hæmorrhage was, however, marked when an attempt was made to remove a portion of the first nodule, and further intervention had to be postponed. The surgical condition, however, soon cleared up; in a few days there was a perceptible improvement in the voice, and this continued until I felt that if the defective voice was connected with the presence of the worm nodules, the improvement might be associated with their gradual disappearance. I then recalled that Joest (1924) and Kitt (1923) had described lesions from which the worms had disappeared. On November 14th, under morphine and a cocaine spray for the pharynx and larynx, the bronchoscope was again passed by Mr. McGibbon, and the worm nodules were found to have disappeared.

The case is an interesting one. It records the definite diagnosis of the disease by endoscopic methods and the taking of material for microscopic examination. On June 6th, there were live worms in the worm nodules. On July 23rd, the nodules appeared to be about the same size. On November 14th, the nodules had disappeared. This had taken just over five months. I do not think that the morphine, the A.C.E. mixture, the cocaine, or the tetrachlorethylene given on June 17th and July 9th, had any effect upon the worm nodules. The hæmorrhage of July 23rd, may have had something to do with reparative processes. The findings of Joest and those of Kitt, together with the conditions under which the present case was kept, suggest that the nodules have a short life, and that if re-infection is prevented it is quite likely that the disease will disappear in from four to five months. The life cycle of *Oslerus osleri* is unknown, but allied groups of nematodes pass through various species of beetles. It is suggested that three or four months rest in a clean, insect-free loose box, may be good treatment in the case of a valuable patient.

To my colleague, Mr. H. T. Matthews, B.V.Sc., F.R.C.V.S., D.V.H., and Mr. R. S. White, M.R.C.V.S., I am indebted for assistance on each occasion that Mr. McGibbon was good enough to carry out the bronchoscopic examination.

References

Hare, T. (1930.) Proc. Roy. Soc. Med. May 28th, 1930.

Pillers, A. W. N. (1928.) *Vet. Rec.*, 1928, viii, p. 688.

Mönnig, H. O. (1934.) Veterinary Helminthology and Entomology, London, 1934. p. 216.

Joest, E. (1924.) Spezielle pathologische Anatomie der Haustiere. III. Berlin.

Kitt, T. (1923.) Lehrbuch der pathologischen Anatomie der Haustiere. II. Stuttgart.

Obituary

PROFESSOR FRANZ von HUTYRA

To our readers, the name HUTYRA will be familiar—probably familiar to a larger number than the name of any other veterinary authority of international repute—by reason of the text-book which, in its English translation, has found its way to the shelves of every veterinary surgeon who has wished to strengthen his faculties for sound clinical observation by reference to what was for some years to our profession the most reliable and compendious source of information in veterinary medicine. It was stated by a distinguished reviewer in writing of the last German edition (6th, 1922) of "*Hutyra and Marek*"—to give the book the short title by which it will be more often referred to by our readers than the longer one "*Special Pathology and Therapeutics of the Diseases of Domestic Animals*"—that "as a text-book for veterinary surgeons it has at present no rival in any language." It had indeed been translated into most of the more widely spoken languages and thus become the standard reference book of several countries. The first German edition of this book appeared in 1905. The splendid service of making this great work accessible to veterinary surgeons in English-speaking countries was rendered, as is well known, by two of the foremost American veterinary authorities, Dr. MOHLER, now chief of the United States Bureau of Animal Industry, and his former colleague, Dr. EICHHORN, who have edited the English translation, the first edition of which appeared in 1912, and the last (3rd), which is a translation from the 6th German edition, in 1926. Its joint authors were awarded the highest prize in the common gift of the veterinary surgeons of the world, namely, the Budapest Prize, at the International Veterinary Congress held in London, in 1930, for the contribution to the general advancement of veterinary science that had been made by the issue of the text-book in its several editions. As is well known, it was Professor HUTYRA who was responsible for the first volume of the book, namely, the one which deals with infectious diseases, his colleague Professor MAREK contributing the remaining two volumes dealing with the diseases affecting particular organs.

To the relatively smaller number in the profession whose particular work and interests must needs take in review current world advances in veterinary science, HUTYRA'S name was, moreover, long familiar, for other reasons—his contributions to the research periodicals, his standing and discourses at International Veterinary Congresses, and his reputation as a brilliant teacher in the famous veterinary school which he adorned for well nigh 50 years. Many will recollect his presence at the International Veterinary Congress held in London in 1930, when they were charmed with a gentleman of courtly mien who spoke English with an easy grace and whose utterances were invariably to the point and always commanded general approval. He was President of the Permanent Committee of International Veterinary Congresses and Chairman of the Hungarian National Committee at the time. It was learned with general regret that illness debarred him from journeying to America for last year's Congress in New York. He had been made Honorary Associate of the Royal College of Veterinary Surgeons in 1914.

It will be wondered by many of our readers, we feel sure, what was the career of the man to whom they have often felt so much indebted for the profound learning and experience collected and placed at their disposal in the book with which they are familiar. Born on September 6th, 1860, in the district in what is now Czechoslovakia—from which later, when he was ennobled by Hungary, he took the patronymic *von Szepeshely*—he graduated as a Doctor of Medicine from Budapest University in 1883. We learn from his colleague, Professor MAREK, that he then began his many-sided active career as an assistant in the Pathological Institute of the University of Sciences in Budapest. From that institute he came in 1886 with a sound training in practical human pathology to the Royal Hungarian Veterinary School at Budapest, and later, after receiving his veterinary diploma, he was appointed at once Professor of Pathology (morbid anatomy) in the school. Following upon the sudden death of the then Professor of Clinical Medicine, Professor A. AZARY, he had to assume for a time charge of the hospital practice of the school. In 1890, he gave up charge of the pathological department of his school to take over the Chair of Special Pathology and Therapy, Medical Clinic, and Study of Infectious Disease. As is well known, at this time on the Continent enthusiastic young teachers who wished to exploit the new knowledge in bacteriology were allotted teaching functions at their schools comprising a variety of odd duties. It was at the beginning of 1901 that this charge was divided and HUTYRA became Professor only of the Study of Infectious Diseases (what would correspond with what we now sometimes call Epizootiology) and Forensic Veterinary Medicine (or Veterinary Jurisprudence, as it more often is called, it seems, in this country).

Through his endeavours the Veterinary School was raised to the dignity of Veterinary Academy in 1890, and again in 1899 it was promoted to that of a College with official status within the University. When he was compelled to retire

HOFRAT PROFESSOR FRANZ von HUTYRA, 1860-1934.

through serious illness in 1933 he had served for 47 years on the teaching staff of this institution, and of these he had spent 35 years as Director, or Rector, as the head was called when it became a College. He voluntarily resigned his position as Life-Rector in 1916, so that the College should be in a position to obtain its status in the University by virtue of having an elected rectorship, but nevertheless he was subsequently re-elected biennially seven times in succession to this position. He took a very active part in the incorporation of the College within the newly-organised University for Technical and Applied Sciences, but his efforts were frustrated by the severe illness that befell him in 1933. He had striven for the recognition of the College as an independent faculty within the University, and the creation of a joint faculty of Agriculture and Veterinary Science was very little to his liking. As head of the renowned Veterinary College at Budapest he displayed, it is everywhere stressed, most remarkable powers of organisation, business capacity, indefatigable industry, skill in negotiation, and a reputation for ability, wide culture, and personal character, which commanded the trust and respect of his colleagues, students, and all with whom he came in contact.

It was in the sphere of infectious diseases, and their investigation and control, that Hutyra gained a high international repute as a research worker of the first order. His successes in this sphere have been ascribed to his early training in practical pathology. His earliest researches were concerned with methods of vaccination against anthrax and swine erysipelas. In collaboration with Preiz he carried out some well-known investigations into the diagnostic value of the tuberculin and mallein reactions, and further performed good work upon the pathogenesis of glanders. He also obtained experimentally corroborative evidence of the value of von Behring's system of vaccinating cattle against tuberculosis, by inoculating them with the human type of tubercle bacilli, but found that the method was not likely to be of avail in practice because the immunity conferred did not last for longer than one year. More recently, as his hearers at the International Veterinary Congress in London will remember, he had carried out some sound work to ascertain the value of Calmette's B.C.G. method of immunisation. Perhaps by far the most useful of his researches were those directed over several years into the investigation of swine-fever, a disease which in Hungary—a great pig-rearing country—assumes enormous importance, and it is thanks very largely to the clearly thought out experimental work carried out by Hutyra and his colleagues that in that country active immunisation against the disease has been placed for a long time upon a sound technical footing and has yielded remunerative returns second only perhaps to those achieved in the United States of America by the use of the same method. Hutyra's work in its conception and general exploitation of available evidence and resources is in striking contrast to the rather sullen, conservative attitude taken up at the same time by the Continental veterinary authorities for a large part, who clung on to the erroneous ideas formerly prevailing regarding the cause of this disease long after the American workers, Dorset and de Schweinitz (1904), had determined a filter-passing virus as generally the primary infective agent. During the latter part of the War, he undertook an investigation of cattle plague in infected territory, and in collaboration with Marek wrote a concise monograph on this disease, apparently with the object of priming up European veterinary surgeons in knowledge of this disease, should it invade Europe again, as it had after past wars; fortunately, this calamity did not arise.

Next to the study of infectious disease in animals, his favourite pursuit was veterinary jurisprudence. He wrote, in Hungarian, a valuable text-book on this subject, which has passed through two editions, and his teachings in the subject seem to have received considerable practical application in his own country, where there exists, based upon them, a legal system of warranty applicable generally to the sale and marketing of animals.

He was the recipient during his lifetime of a great many honours from veterinary, agricultural, and scientific bodies in his own country and from several countries abroad. He had performed very notable service to the veterinary profession in Hungary as President of the National Association of Veterinary Surgeons and of the National Veterinary Council. He was a member of the Upper House of Hungary. One feels that with his death, in his 75th year, there passes away one of the last of the fast-dwindling band of great international veterinary personalities, through whose enterprise, learning, and profound devotion to their calling the full significance of the new discoveries in medicine at the end of the last and the beginning of this century were fully grasped, and the foundations of a rich and new heritage in veterinary endeavour surely laid.

A vast concourse of mourners, representative of all kinds of interests in university and scientific life, colleagues, former students, admirers, and friends, assembled at his funeral on December 22nd last, which moved off from the great hall of the former Royal Veterinary College, Budapest, and at his graveside moving tributes were paid by eminent men to his memory.

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Death of Mr. W. R. Davis

Davis, William Richard. Plas Gwyn, Russell Road, Rhyl. Graduated New Edinburgh, April 21st, 1883; died January 11th, 1935.

AN APPRECIATION

(Contributed)

The death of W. R. Davis, M.R.C.V.S., at the ripe age of 86, removes yet one more of the small band of those who graduated from the New Veterinary College, Edinburgh.

The period of his studentship at the New Veterinary College produced a remarkable number of men who by their work in one direction or another left their mark. They were in the first instance, as were so many of "Old Billy's" men, successful practitioners and many were accordingly also good business men.

Will Davis, however, although he had a very varied career, remained to the end essentially the student, with a modest and retiring demeanour, with the result that only those few who knew him intimately were able to recognise the man of wide experience and originality of thought. The veterinary profession as a whole never fully appreciated him and mainly because he despised any form of self advertisement, and merely regarded anything he could do for the Animal Kingdom, that he knew and loved so well, as his duty.

Those of us who had the good fortune to be students when he taught Materia Medica at the old College in Leith Walk, will remember him with affection, for not only did he teach the subject for which he was responsible, but filled up the gaps in other subjects such as Pathology and Bacteriology.

He had in a peculiar degree the gift of attracting young men to him, and when, as many did, they gave him their confidence and trust, he never failed them.

It would be idle to attempt to describe his career in detail, for it varied from that of the country practitioner and of the teacher to that of the research worker—added to which, he was sent out by the British Government to Basutoland on rinderpest work. He also had a considerable period with the Remount Commission which was sent to America during the Boer War and had veterinary charge of the station at New Orleans.

In 1902, he settled down at Enfield, Middlesex, where he carried on a very large practice and many of his old friends will remember his many papers and communications to the Central Veterinary Medical Society. He was a regular contributor to the Veterinary Press and to the very end he retained his interest and keenness in everything that pertained to the veterinary profession.

His final years were spent in semi-retirement in Rhyl, North Wales, and only a few days before his death he held forth with all his old vigour and enthusiasm about the iniquity of using magnesium sulphate as a purgative for cattle and also that the treatment of lymphangitis by hot fomentations invariably resulted in chronic thick legs. [As was customary with him, Mr. Davis evidently decided, there and then, to give his fellow practitioners the benefit of his long experience through the medium of *The Veterinary Record*, for in this issue, and on these topics, we have the sad privilege of publishing his last communication to the Veterinary Press.—Ed., *V.R.*]

A native of the Isle of Man, he was a storehouse of knowledge about the folk lore and history of that "Kingdom," of which he was very proud. He was never tired of recounting experiences when fishing and shooting in the out-of-the-way beauty spots of that lovely island.

We buried him on Monday in a quiet corner of the cemetery, with his two daughters and son and a few of his old students to bid him farewell.

Abstracts

[Seventh Conference of Specialist Veterinary Surgeons on the Diseases of Breeding Stock. [Summary.] Miessner, H., and Koser,, A. (1934.) *Deuts. tierärztl. Wschr.* 42. 418-432.]

This article consists of a summarised review of the work which has been carried out in 25 veterinary institutions on the diseases of domestic animals, and as such it cannot receive adequate treatment in an abstract.

Horses.

Sterility.—Catarrhal endometritis, cystic ovary, pyometra, and atony of the uterus were the chief causes encountered. Methods of treatment which received extensive trial included lavage with saline, Lugol's solution and Dijozol; and injections of Yatren, and methylene blue. No figures are suitable for comparing these types of treatment. Bacterial examination of uterine secretions revealed *Bact. coli*, *Strep. pyogenes*, and micrococci.

Abortion.—*Strep. pyogenes* and *Bact. abortus equi* were each found to be the cause of about 13 per cent. of cases of abortion amongst a group of 302 fœtuses. Agglutination tests of 1,679 blood samples showed 23 per cent. positive to *Bact. abortus equi*. Examination of uterine secretion in cases of abortion revealed *Strep. pyogenes* in 19 per cent., micrococci in 7 per cent., *Bact. coli* in 3 per cent. and *Bact. abortus equi* in 2 per cent. of 254 examinations.

Foal Diseases.—34 per cent. of 483 cases died of non-bacterial causes; these cases were not sub-classified. Of the remainder, 21 per cent. died of streptococcal infections, 20 per cent. of *Bact. viscosum equi*, and 19 per cent. of *Bact. coli*.

Cattle

Sterility.—The relative incidence of the various conditions causing sterility is recorded,

as it has been found by eight independent investigators. They agreed that endometritis and persistent corpus luteum were the two most important causes, but they differed as to which condition occurred the more commonly.

Abortion.—Brucella infection was encountered in 30 per cent. and streptococci in 1 per cent. of 103,023 samples (*i.e.*, fœtus or genital secretion or milk). A very small percentage of abortions were due to trichomoniasis and to *Vibrio fœtus*. At Königsberg the sera of 2 per cent. of bulls agglutinated *Br. abortus*.

Calf Diseases.—Mortality amongst calves was attributed to *Bact. coli* (42 per cent. of 5,254 calves), salmonella (11 per cent.), streptococci (10 per cent.) and pasteurella (7 per cent.). No new methods of combating calf diseases were recorded.

Sheep

Abortion.—Of 193 fœtuses examined, 20 per cent. were aborted as a result of infection with *Bact. abortus ovis*, 11 per cent. *Vibrio fœtus*, and 3 per cent. *Br. abortus*.

Diseases of Lambs.—No specific infection caused a striking mortality amongst lambs. Pasteurella occurred in 18 per cent., and *Bact. coli* in 9 per cent. of 924 cases, while 13 per cent. died of parasitic diseases. *Hæmonchus contortus*, nematodirus, *Fasciola hepatica*, tæniæ (unspecified) and lung worms (unspecified) were the worm parasites of greatest importance.

Pigs

Abortion.—Only 6 per cent. of 306 cases of abortion were due to brucella infection, 16 per cent. were attributed to *Bact. coli*, whilst for 65 per cent. of cases no cause could be found. Out of 263 blood agglutination tests, 90 were positive to *Br. abortus*.

Diseases of Young Pigs.—Of 6,593 cases, 16 per cent. died of *Bact. coli* infection, 10 per cent. of enzootic pneumonia, 9 per cent. of pasteurella infection, 8·5 per cent. of streptococcal infections, 8 per cent. from errors in hygiene, 8 per cent. of swine fever.

Fur-Bearing Animals

Out of 312 cases, about 30 per cent. were due to parasitic conditions, 10 per cent. to salmonella and 6 per cent. to pasteurella infection.

Poultry

In fowls the chief causes of death were bacillary white diarrhœa, coccidosis, helminth infections, infectious laryngo-tracheitis, fowl paralysis, and leucosis. E. J. P.

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[Influence of Nutrition upon Sterility and Contagious Abortion. Wagener. (1933.) *Berl. tierärztl. Wschr.* 49. 709-713 and 725-727.]

Over a period of five years the author has studied four dairy herds, containing on the average 16, 28, 12 and 35 milking cows, with a view to correlating methods of feeding with the milk production and fecundity of the cows.

At the commencement of the survey Herd I showed a very high level of fecundity, and a comparatively low milk yield of 2,800 kilograms of milk per cow per year. The diet was changed from grain concentrate to oil cake, with the result that the milk yield rose to 3,500 kg., but the fecundity rate fell by 50 per cent.

Herd II showed a gradually improving fecundity rate at a level of about 70 per cent.; the milk supply also improved, around the level of 4,000 kg. This high level appeared to be associated with heavy concentrate feeding and a considerable time spent at pasture. The gradual improvement accompanied a change from oil cake to grain.

Herd III showed a rather similar picture, but in this case, instead of improving gradually, the reverse took place. This gradual falling off was associated with a change from grain to oil cake feeding.

Herd IV maintained a high percentage of fecundity but a low milk supply. A temporary rise in the milk output was associated with a temporary increase of the grain ration.

E. J. P.

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[Further Studies of Vaccination during Calfhood to prevent Bang's Disease. Cotton, W. E., Buck and Smith. (1934.) *J. Amer. Vet. Med. Ass.* *38*. 3. 389-399.]

This article describes experimental work designed to confirm or disprove promising results, previously obtained by Buck, on the elevation of resistance of bovines to *Br. abortus* by vaccination, during calfhood, with living vaccine.

Seventeen calves were vaccinated between the ages of four and six months, whilst 16 animals, of similar ages were retained as controls. Of all these animals; three had serum titres of 1:25; the remainder were negative to the agglutination test. Of the vaccinated group, nine calves received a vaccine of low virulence whilst eight received one of normal virulence, 10 c.c. doses being administered. Vaccination was followed by a slight elevation of temperature lasting a few days, and local œdematous swellings. Marked agglutinin reactions followed vaccination, the titre apex being reached in about 15 days. Thereafter titres fell gradually until, after five months, with one exception no titres were higher than 1 : 50. None of the calves subsequently produced by these animals showed titres over 1 : 50, which is taken as evidence that none of the vaccinated animals became permanent carriers of *Br. abortus* as the result of the calfhood vaccination.

During their first pregnancy all heifers were

exposed to infection, by instillation of virulent culture on to the conjunctiva. Of the 17 vaccinated animals, only one became infected, which, however, succeeded in producing a weakly calf. Of the 16 control animals, nine became infected; whilst in this group there were seven abortions and three weak calves produced. In the vaccinated group ten cows were watched during their second pregnancy; during this period only two became infected, but all produced vigorous calves.

It is concluded that the vaccination of calves produced a strong resistance to infection during the first pregnancy, and that this resistance may have a lasting effect. The agglutination titres, following vaccination, subside in intensity more regularly than they do when mature, unbred cattle are vaccinated. A strain of *Br. abortus* of low virulence conferred as strong an immunity as that produced by a virulent vaccine.

E. J. P.

Review

["**The B.C.G. Vaccine.**" K. Neville Irvine, D.M., M.A., B.Ch. (Oxon.), M.R.C.S., L.R.C.P. pp. 70. (315 refs.) Oxford University Press, London: Humphrey Milford. 5s. net.]

The publications on various aspects of vaccination with B.C.G. which have appeared during the past ten years, are so numerous and so scattered throughout the literature, and in certain instances are so biased either in favour of or against the method, that it is extremely difficult to obtain a proper perspective of the subject. Dr. Irvine has not undertaken any personal investigations into B.C.G. vaccine, but he has visited many laboratories and clinics in all parts of the world and has attempted to summarise the situation, from the point of view of an outsider, in as impartial a manner as possible. He has succeeded in presenting in a succinct form a most readable book and, at the same time, a dispassionate review of the advantages and drawbacks of Calmette's method of preventive inoculation against tuberculosis.

In the preliminary chapters, the nature of the strain, the preparation of the vaccine and the arguments for and against a return of virulence, are discussed. Under the latter heading, he very rightly suggests that some of the controversy on the question of virulence might have been avoided if recognition had been given to what was undoubtedly Calmette's belief, *viz.*, that his strain was deprived of virulence when cultivated according to his instructions. Much confusion has arisen from experiments on the growth of the organism under entirely different conditions.

On the question of immunity Dr. Irvine suggests that the results obtained in cattle hold out considerable hope of success, but that in monkeys and small laboratory animals most of the experiments which have been reported have been inconclusive. He considers that in man a definite immunity can be detected although the degree of the protection has not yet been measured, while sufficient work has been done to show that the vaccine is innocuous for normal children.

The book can be commended for the conciseness of the subject matter and the moderation of the conclusions.

Report

TANGANYIKA TERRITORY

ANNUAL REPORT OF THE DEPARTMENT OF VETERINARY SCIENCE AND ANIMAL HUSBANDRY FOR THE YEAR 1933

This report of 111 pages is set out in five parts.

Part I deals with staff and general aspects of administration. Retrenchments in the European staff in recent years have so reduced the efficiency of the department that the present personnel is finding it increasingly difficult to control the major diseases; in fact, it is stated that a guarantee can no longer be given to neighbouring countries that they will not be endangered by extensions of rinderpest, bovine pleuro-pneumonia and rabies. There are now only 15 veterinary officers as compared with 21 in 1928. An alteration in the system of administration was introduced during the year whereby each province of the territory was placed in complete charge of a veterinary officer and became a self-contained unit under the general supervision of the Director and his deputy.

Part II, contributed by Mr. H. G. Lowe, deals with disease control in the field.

Rinderpest has become a big problem and has engaged the major portion of the staff's time. At the beginning of 1933 there were 36 outbreaks spread over three provinces, but these were reduced to 13 outbreaks by the end of the year. A new policy has been adopted for its suppression, *viz.*, the application of strict quarantine on infected herds and the double-inoculation of all infected and incontact herds. The migrations of infected game have proved a menace to control measures. Wildebeeste were incriminated in this respect for the first time. Eland, buffalo, wild pig, warthog and giraffe are, in addition, known to be particularly susceptible to the disease.

Contagious Bovine Pleuro-pneumonia.—Five fresh centres of this disease were discovered during the year. The disease is being controlled by quarantine and vaccination (culture vaccine).

East Coast Fever.—This disease continues to cause a greater mortality in cattle than all

other diseases combined. In the enzoötic areas about 50 per cent. of the calves born die from it, while the remaining 50 per cent. invariably become infected also, but recover with a resultant permanent immunity, so that all adult animals in these areas are immune. Control is seriously handicapped by an insufficiency of funds for the erection of more dipping tanks.

Trypanosomiasis.—This is widespread in the cattle population of the territory and it appears to be extending in certain districts. A policy of reclamation and bush-clearing of some of the tsetse-infested areas is proceeding satisfactorily.

Anthrax.—This appears to exist in every part of the country and hundreds of infected carcases have been handled and eaten by natives without harm. The use of spore-vaccine from Kenya has given satisfactory results.

Blackquarter.—Several cases of this disease were reported and vaccination of one herd was carried out.

Foot-and-Mouth Disease.—Although existent in the country, this causes little damage, owing to its mild nature.

Tuberculosis.—The infectivity rate of cattle in one province was estimated at 0·85 per cent. Elsewhere it seems to be extremely rare.

Heartwater.—The disease has been diagnosed in Merino sheep and cattle. It is not possible, as yet, to assess its importance or distribution.

Other Diseases.—Streptothricosis and follicular mange cause serious damage to the skins of cattle. Sarcoptic mange of sheep is ubiquitous. Snotsiekte of cattle has been shown to be carried by wildebeeste. Helminthiasis is rife in all animals. *Cysticercus bovis* infection was responsible for the condemnation of 4 per cent. of all bovine carcases inspected in the 24 abattoirs of the country. Horse-sickness and epizoötic lymphangitis affect the small equine population. Fowl typhoid and avian diphtheria are the major diseases of poultry and in dogs distemper, piroplasmosis, trypanosomiasis, ankylostomiasis and mange are the main infections. Although rabies has not yet been confirmed at the laboratory, it would appear from field observations that it exists.

Part III deals with routine laboratory work and veterinary research. Some 50,000 doses of anti-rinderpest serum and 41,000 doses of rinderpest vaccine were issued from the laboratory. Formol-glycerine rinderpest vaccine was found to be more stable than formol-saline vaccine; it retains its potency for four months at room temperature. Various minor products were also prepared at the laboratory and 1,731 morbid specimens were examined.

Research into different aspects of trypanosomiasis was carried out by the Director (Mr. Hornby) in collaboration with Mr. Evans, Mr. Bailey and Mr. Cornell. This included a study of the habitats of *Glossina pallidipes* and its unsuspected rôle in the transmission of the disease in a farm some four to five miles removed from a main fly-belt. Bush-clearing was undertaken to stultify its progress. Some interesting observations were made on the pathology of *T. congolense* infection. It would appear that this trypanosome remains confined within the blood-system, since extensive examination of sections of tissues failed to demonstrate it in an extra-vascular position. The absence of increase in reticulocytes in the blood, following infection with *T. congolense*, suggests that the anæmia is myelogenous in origin. The treatment of *T. congolense*-infected cattle with the new Bayer product, "Surfen C," has given encouraging results. A single intramuscular injection of this drug appears to be as effective as a course of five-weekly injections of antimosan or tartar emetic. The results of treatment of 100 cases of *T. congolense*-infected cattle with tartar emetic and antimosan are recorded. Of 36 cases treated with antimosan 92 per cent. recovered, and of 54 treated with tartar emetic only 46 per cent. recovered. The treatment of *T. vivax* infection of cattle is stated to be a simple affair. One course of five injections of antimosan or tartar emetic cures the great majority, if not all, of those animals that survive the course of treatment. *T. brucei* infection of cattle is rare—only five cases were encountered in a total of 500 cases of trypanosomiasis, and of these three recovered spontaneously. An important observation is recorded of the serious and often fatal effects of *T. theileri* when injected with blood, used in rinderpest immunisation, into cattle that are not already premune. The tartar emetic solution used for the collection of the blood does not destroy this trypanosome as it does the other species.

Mr. French contributes an article on the changes in serum proteins during rinderpest infection.

Part IV deals with Animal Husbandry, and two valuable contributions are made; one by Mr. French on the nutritional values of various native and other foodstuffs and the other by Mr. Staples on pasture research. Mr. French also gives an account of his survey of phosphorus sufficiency in the territory, from which he concludes, tentatively, that there is no great lack of this mineral but that protein and energy-forming substances are deficient and require urgent attention. The work of this section of the department is an excellent tribute to the staff concerned and clearly demonstrates the value of promoting research into this subject throughout the colonies.

Part V gives a general account of Husbandry and the livestock census for the year. The latter is: cattle, 4,852,606; sheep, 1,935,116; goats, 2,839,529; pigs, 4,917; donkeys, 50,132; horses, 92; mules, 54; camels, six.

W. K.

N.V.M.A. Divisional Report

EASTERN COUNTIES V.M.A.*

MEETING AT BURY ST. EDMUNDS

The Autumn Meeting of the above Division was held at the Angel Hotel, Bury St. Edmunds, on Friday, October 12th, 1934.

The President, Mr. P. J. Welch, occupied the chair, and the following members were also present: Messrs. J. M. Buchanan, B. W. Blomfield, D. Blyth, W. J. Browning, A. F. Castle, W. H. Dennett, S. E. Hill, T. G. Heatley, D. S. Jack, W. F. Loveless, G. T. Matthews, C. T. Murphy, C. C. Nesling, N. F. Pollock, R. Burgess-Smith, P. R. Turner, W. Waters and the Hon. Secretary. Captain J. D. Broome and Dr. G. B. Brook were present as visitors.

Communications of apology for their inability to attend were received from Messrs. H. Buckingham, J. G. E. Gallie, Sir F. Hobday, Messrs. W. F. Howes, H. J. Loveless, E. Brayley Reynolds, H. P. Standley, sen., F. Thurston and W. Turtill.

New Member.—Captain J. D. Broome was elected to membership of the Division.

Next Meeting.—It was decided to hold the Annual General Meeting at Norwich in February.

Resolution.—The following resolution was brought forward by Mr. N. F. Pollock: "That the N.V.M.A. be requested to seek from all insurance companies doing livestock business, an assurance that no certificate in relation to the examination or treatment of livestock insured by them will be accepted from other than a qualified veterinary surgeon." Considerable discussion centred around this resolution and, at its conclusion, Mr. P. R. Turner seconded Mr. Pollock's resolution and the Secretary was instructed to forward it, together with the main points of the discussion, to the Council of the N.V.M.A. for their consideration.

Demonstration.—Dr. G. B. Brook then gave an interesting demonstration on spinal anæsthesia. After the demonstration he gave an address, illustrating his remarks with a series of lantern slides and charts.

Major T. G. Heatley, in proposing a vote of thanks to Dr. Brook, said he had immensely enjoyed that afternoon's proceedings, as he was sure all the members had. Mr. W. Waters seconded the vote of thanks, amidst applause.

At the conclusion of the meeting, the President entertained the members to tea and the proceedings were wound up with a hearty vote of thanks to the President for his hospitality and conduct in the chair.

H. P. Standley, Jun., *Hon. Secretary.*

* Received for publication, January 2nd, 1935.

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Jan. 23rd.—Special Meetings of Council and of Committees, R.C.V.S.

Jan. 23rd.—Meeting of the Section of Comparative Medicine, Royal Society of Medicine, at 1, Wimpole St., W.

Jan. 25th.—Annual General Meeting of the Royal Counties Division, N.V.M.A., at Reading.

Jan. 25th.—Meeting of the Yorkshire Division, N.V.M.A., at Leeds.

Jan. 28th.—Meeting of the Editorial Committee, N.V.M.A., at 2, Verulam Buildings, Gray's Inn, W.C.1, at 4 p.m.

Feb. 6th.—R.C.V.S. Voting Papers issued to members overseas.

July 29th—August 2nd: N.V.M.A. Congress at Belfast.

* * * * *

N.V.M.A. CONGRESS AT BELFAST

At a Meeting of the Provisional Committee held in Belfast on November 21st, 1934, it was decided to hold the Annual Congress from Monday, July 29th to Friday, August 2nd, 1935.

In forwarding the above information, Mr. J. I. Magowan, Local Hon. Secretary for the 1935 Congress of the N.V.M.A., says: "In choosing this period the Committee had in mind the fact that on the week following the Congress in Belfast there is held in Dublin the Annual Horse Show, the greatest event of its kind in the world; thus, members attending the Congress will have the opportunity of visiting this Show which is bound to have an appeal to all both as a Show and a brilliant social event.

"It is also felt that the selection of dates at the end of or beginning of a month will interfere less with holiday arrangements than any other time."

* * * * *

PERSONAL

Appointment.—Mr. E. F. Peck, M.R.C.V.S., B.V.Sc. (Tor.), D.T.V.M. (Edin.), Veterinary Officer, Nigeria, has been appointed Veterinary and Agricultural Officer, Somaliland.

. . . . .

Marriage.—Gordon—Porter: At St. Andrew's Parish Church, George Street, Edinburgh, on December 24th, by the Rev. Dr. George Christie, assisted by the Rev. W. Alexander, M.A., William Smith Gordon, Ph.D., M.R.C.V.S., younger son of Mr. and Mrs. Robert Gordon, 2, Northfield, Liberton, Edinburgh, to M. Leone, daughter of Mr. and Mrs. J. Findlay Porter, of 17, Danube Street, Edinburgh.

. . . . .

Will.—Baxter, Mr. James William, M.R.C.V.S., of Chelsea (net personalty £3,586), £5,823.

WOMEN AND THE PROGRESS OF VETERINARY SCIENCE

Mrs. R. F. Stirling's Address to the Central Provinces Association

Addressing the Tenth Annual Conference of the Central Provinces Veterinary Association, held at Nagpur last year, Mrs. R. F. Stirling, wife of the President Founder (Major R. F. Stirling—who also delivered a valuable address), expressed the "great and enduring" pleasure afforded her in being privileged to be the first woman to open a conference of that kind.

Proceeding, Mrs. Stirling said that she could remember, as well as if it were yesterday, the day on which her husband came back to tell her that at last one of his dreams had been realised and that a Veterinary Association had been formed in the Central Provinces. It started with a small gathering, only a few men who had resolved to have some means by which their colleagues, scattered throughout that huge province, could be kept in touch one with the other.

From that day to this, her interest in the Association had never ceased to grow and she was very proud indeed when they paid her the honour of making her an honorary member.

"During my recent visit to England," continued Mrs. Stirling, "I was amazed to find how many ladies were now engaged in the practice of the veterinary profession in Great Britain. The opening of your profession to us after the war marked another stage forward in the tale of the complete emancipation of western woman. In this connection, it will interest my lady friends here to learn that this year—that is to say, in the four-year course which ended in July, 1933—it was a girl student of the London Veterinary College who won the FitzWygram prize for the highest aggregate marks obtained in all the examinations held during all the four years of the course. A girl won this coveted prize for the first time in history.

"Young girls who have taken up your profession in the west are finding plenty of work to do in connection with the smaller animals, especially dogs, cats and birds. But there is another side of the profession to which perhaps we, lay people, do not give sufficient thought. We all know that the veterinary surgeon or veterinary assistant surgeons can treat wounds and diseases of animals, that by timely injections or inoculations of suitable sera or vaccines, he can prevent the very occurrence of contagious diseases; we are all aware of the pain and suffering he can save the dumb creation and the economic benefit he can bestow on the individual owner or upon the country at large—we know of all this work, but how little do we ever think of the patient, long-drawn-out, often heart-breaking work that is being done by veterinary surgeons behind the scenes? I refer of course to the research workers in laboratories and in the field all over the world. By their painstaking endeavours, by their laborious hours, often by great personal sacrifice, they have made the use of preventive medicines possible, and it is by their work that the lives of our fellow men and women and our animals are saved. It is in this sphere also perhaps, this grand and glorious work, that my sisters in the profession will make their presence felt in the future. Women are patient and perhaps their very nature will enable them to await results in a more philosophical spirit than will the more active and restless men. I have been told that, in more than one of our great research laboratories in England, there are women, some of them veterinary surgeons, of whom great things are expected in the years to come. We can reasonably hope so, when we remember that it was the patient tedious work of Madame Curie which brought to light the new element radium with all the wonders of its healing powers.

"In India perhaps there is not so much scope for women veterinary surgeons, at least at the moment. At the same time I feel sure that if and when the Indian girl does take the first step, she will make a very fine thing of a practice in, say Bombay, Calcutta, Delhi or Simla. To have a lady giving her sole attention to the pet animals in any of our larger towns in India would, with the present increasing interest in such animals, ensure her an income which most men would not despise. Of this I am certain, and it may not be very long before we see such an attempt being made here, and I believe that when made, it will succeed beyond all expectations.

"Even although that day may be a little distant, there is one branch of your work in which your family members can help you very much indeed. I refer to that branch of your duties known under the general term of 'village uplift.' This term covers a number of activities, ranging from the cleanliness of the village streets to the welfare and education of children, and the improvement of the cattle of the province, which animals are the actual or potential wealth of so many of the rural inhabitants. In this work you will never get complete success unless you manage to obtain not only the interest but also the co-operation of the women of India.

"I have seen a good deal of your work in connection with village uplift, but I have also seen a great deal more of your more ordinary work, in the various dispensaries throughout the Province. There are some few dispensaries I have not seen as yet, but I hope that before my time comes to leave India, I shall have had the opportunity of seeing you all in the places in which you work. Although it may seem to be outside my sphere of activities I most certainly do take a keen interest in the progress of each dispensary we visit, and I do not think that there is anyone who reads more carefully, more thoroughly and with greater interest than I do the Annual Report on the working of the Veterinary Department.

"In an excellent article in your Magazine some months ago, Rai Saheb Gouri Shanker published an account of the progress of the Veterinary Department in this Province during the past 30 years. The increase of your activities in every direction, the many examples of new methods of prevention and cure, and the manifestation of the growing confidence of the people in your institutions made me very proud of my connection with this department.

"I cannot leave this subject without congratulating the department as a whole, on the splendid success which has attended its efforts to obtain a cheap and reliable method of protecting cattle against the most serious disease which exists in this part of the world. I have seen the private letters which have come to Nagpur from all parts of the world, concerning this goat-virus work; and it must be a source of gratification to you all to know that what is being done in the Central Provinces, is being eagerly watched by scientific workers in many other countries."

Mrs. R. F. Stirling

Eighty-five members from all parts of the Province attended the opening session of the conference, at which the following address, copies of which were printed in English and Hindu, was presented to Mrs. Stirling: "We, the office-bearers and the members of the Central Provinces Veterinary Association deem it a proud privilege and a great honour to present to you this address as an humble token of our profound admiration for you and in recognition of the numerous services you have been rendering to our Association during the past decade.

"It was in the year 1920 that you first came to this province; and ever since you have been taking a very great interest in those employed in the Veterinary Department. Your enthusiasm soon inspired us to have you in our midst as an Honorary Member of our Association. The invaluable contribution you have been making to the social life of our Association in general, and of our conferences in particular has made a permanent mark in the history of our Association. You gave real life to our conferences by bringing both Indian and English friends together, thus affording us all a splendid opportunity to know one another intimately.

"Your gentle nature, your eagerness to help all, your kindness and your readiness to assist the Association in all possible ways are greatly appreciated by the members of this Association.

"We offer our humble tribute to you, Madam, to whom our Association is greatly indebted for all that you have been doing for its welfare.

"We fervently pray that you may be spared to enjoy a long life of peace and prosperity."

VETERINARY SURGEON ROBERT MOORE

An Addendum

Apropos "The Veterinary Profession in South Africa: A Veterinary Account of the Zulu War, 1879." H. H. Curson. Veterinary Record, January 5th, 1935.)

079
2662

Extract from Report from Lieut.-Colonel Baker Russell, C.B., dated Army Headquarters, Camp Sekukunis Town, Transvaal, South Africa, December 1st, 1879, of the action fought on the 28th ultimo against Sekukuni; and forwarded by Sir Garnet Wolseley.

Bringing to notice:—

"Veterinary Surgeon Moore who attended to wounded horses on the field with great coolness."

True extract, forwarded to V.S. R. Moore.

J. Collins,
P.V.S.

Principal Veterinary Surgeon's Office.
June 1st, 1880.

. . . . . .

079
2717

Forwarding dispatch from General Wolseley, dated Army Headquarters, Pretoria, Transvaal, South Africa, December 27th, 1879:—

Extract:—

"Veterinary Surgeon Moore is an excellent officer, he was in veterinary charge of the Force employed in the operations which led to the capture of Ketchwayo, and of that engaged in the Sekukuni campaign."

Sgd. G. S. Wolseley,
General.

True extract, forwarded to V.S. R. Moore.

J. Collins,
P.V.S.

Principal Veterinary Surgeon's Office,
June 1st, 1880.

. . . . . .

Veterinary Surgeon Robert Moore was awarded the Zulu War Medal.

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ACCREDITED PRODUCERS' SCHEME: LEGAL DIFFICULTIES

"Legal difficulties may prevent the operation of the revised accredited producers' scheme as agreed upon between representatives of the Milk Marketing Board, the County Councils' Association, and the Association of Municipal Corporations," says *The Farmers' Weekly.*

"The Board's original scheme stipulated that the bacteriological count of accredited milk should not exceed 200,000 per cubic centimetre at the farm. The representatives of the County Councils contended that that standard was too low, and it was eventually agreed that accredited milk should comply with the Grade 'A' designation.

"But the legal standard of Grade 'A' milk is that it must not exceed a bacteriological count of 200,000 when it reaches the consumer. Since neither the Milk Board nor the County Councils' representatives desire that the wholesale producer should be responsible for the condition of his milk after it leaves his hands, it would appear that the Grade 'A' legal standard cannot be applied to accredited milk.

New Grade Designations Probable

"The Ministry of Health are unlikely to ask the House of Commons for a revision of the

Grade 'A' standard to meet the present difficulty, because it is believed they intend to simplify the present designations as soon as the accredited and attested schemes begin to operate.

"It seems probable, therefore, that the County Councils, having accepted the principle of an accredited milk roll, may eventually accept the Board's original scheme as being the only practical method of cleaning up the nation's milk supply.

"It is understood that, if the Councils do agree to operate the Board's scheme, the Ministry of Health will sweep away the present designations of milk and institute instead the grades of ttested, or tubercle-free milk, accredited milk, nd ordinary milk."

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

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THE DOUBLE INTRADERMAL TEST

To the Editor of the Veterinary Record

Sir,—I should like to congratulate Mr. J. Weir upon his most excellent article on the double intradermal test as published in the *Record* on January 5th. It is refreshing to find an expert admit that there are great difficulties in some cases in reading the test and his explanations of some of the swellings met with are of great interest. While admitting that this test is the best one we have, I still feel that if, say, six experts examined twelve doubtful reactors their final opinion would differ largely, and if all the animals were slaughtered straight away and a careful *post-mortem* made, the result would prove of great interest when applying the test in a certified herd. At present one is not allowed to classify an animal as doubtful without removing it from the herd and I should be interested to hear, if one follows out Mr. Weir's suggestion of applying the intrapalpebral test at the 48th hour in doubtful cases and should that test be negative, whilst the intradermal is still doubtful, whether the Ministry of Health would recognise the former and allow the animal in question to remain in the herd.

I published a criticism of the test in the *Record* of September 1st, 1934, describing three apparently perfect reactors which, on being slaughtered and examined very carefully by three veterinary surgeons, revealed no evidence of the disease, and I should be interested to hear if Mr. Weir has ever had the same unfortunate experience.

Yours faithfully,

38, Head Street, W. Waters.
Halstead, Essex.
January 11th, 1935.

* * * * *

CHOKING BY SUGAR BEET PULP

To the Editor of The Veterinary Record

Sir,—Some four years ago, I gave my experiences of sugar beet choking in *The Veterinary Record*. Since then such cases have gradually decreased and are now comparatively rare, the reason being that farmers have discovered that by steeping the pulp it becomes quite a safe feed for horses. I have never known a case of choking by steeped pulp, but with the unsteeped I had five horses choked out of a stable of eight within two days. Although large quantities of the dry pulp are fed every day to cattle and sheep, I have not seen or heard of a case of choking from it in those animals.

My experiences and results are similar to Mr. Coleman's, but I do not altogether agree with his treatment. I have discarded the use of the probang and the giving of oil. It is always the ensuing pneumonia that kills, and I blame that form of treatment for causing it. My usual treatment now is as follows: a dose of arecoline, a bucket of water with a handful of salt (kept constantly replenished in the manger so as to allow the animal to drink and slobber in it at will), and every hour or two I tell the attendant to wash the animal's gullet out with one or two swallows of a solution of chlorate of potash, with kneading if the obstruction is in the cervical region. Too often, however, it is in the thoracic cavity where the obstruction is greatest—the cervical portion can be cleared every time. Only last week I made a *post-mortem* on a horse choked with beet pulp, and found the last foot of the gullet so tightly packed and dry that no treatment short of an operation could have moved it. This horse looked like dying four days before he did so, as on my first visit the owner told me he had given him two colic drinks, and the condition of the horse's lungs indicated as much. A horse can endure very little oil on his lungs, but it is wonderful what a great quantity of watery solution he can stand with apparently little ill-effect. A horse that drinks voluntarily will, when choked, retain the liquid much longer than when it is given with a bottle or by tube. The raising of the head and the passing of the tube appear to aggravate the "retching" symptoms. On arrival at a farm I found a cart mare drinking at a water trough in a covered-in fold yard. On watching her I found that, after a few swallows, she stood quiet for a few minutes then suddenly started vomiting up quantities of water and beet pulp; immediately after she would drink more water and repeat the process. I came to the conclusion that she was washing out her gullet much better than I could do it. Unknown to the farmer or his man I left the mare untouched, with instructions that she was to be left beside the trough until she was better. The following day she was quite recovered and eating hay. Judging from the filling of the gullet from the chest upwards, and from the amount of pulp in and around the trough the next morning, the mare was badly choked.

How long can a horse be choked and then recover? I have known them to recover after six days. I had a mare die nine days after from pneumonia, but I considered that her gullet was clear three or four days before death.

Yours faithfully,

Boroughbridge, Wm. A. Campbell.
Yorks.
January 12th, 1935.

* * * * *

MASTITIS

To the Editor of The Veterinary Record

Sir,—The recent references to this malady which have appeared in the *Record* prompt me to make a few remarks thereon. Mastitis in the cow and laminitis and lymphangitis in the horse are all apt greatly to depreciate the value of the patient when recovery has taken place. This is especially the case in mammitis, where repeated doses of Epsom salts are given and the bag is subjected to frequent fomentations; in laminitis, where, in severe cases, the horse is allowed to stand (which it usually will do persistently) and

in lymphangitis, where fomentation of the limb is adopted.

These maladies are referable to disturbances in the digestive tract, save that, in the first two, the uterus may be its seat of origin. I have treated five cases of lymphangitis in a stable of horses on the Monday to which vetches were freely fed on the Saturday evening and Sunday; the adulteration of ground maize with ground wheat and the feeding of this to horses has been followed by many cases of laminitis, and mammitis is of frequent occurrence in cows after feeding pea meal. Though it is doubtless true that microbial flora are obtainable from the diseased gland in mastitis and that in some cases they may bring about the changes observed, I have long been convinced that troubles in the digestive apparatus caused by certain foods account for many cases and that these may be influenced by internal medication. An aperient is indicated, and what I have found most useful is the administration of two ounces of concentrated liquor ammon. acet. (made by mixing a pint fo liquor ammon. fort. with about three pints of strong acetic acid —when the solution is cool after reaction ammonia should be added until a distinct ammoniacal odour is present), with a couple of pounds of treacle and a quart of hot water. This dose is to be given night and morning until the bowels are relaxed. Solution of perchloride of mercury (one in 500 or 1,000 of normal salt solution) can be applied to the udder, which should be stripped twice a day only. I may add that I have found excellent, in cases of laminitis in horses, two ounces of the liq. ammon. acet. conc. with a pint of raw linseed oil, half the dose to be repeated next day—but the patient must be cast repeatedly for the first two days.

In lymphangitis, after a ball of aloes and calomel the lotion of perchloride and salt solution should be used, but on no account should the limb be fomented.

I think it must be 30 years ago since I first ventured to express the opinion, at a veterinary meeting, that magnesium sulphate in large doses (1 lb.) was a dangerous medicine for cattle and that liq. ammon. acet. was as effective and infinitely less dangerous. I got laughed at for my pains, but my views have since been confirmed by others.

Yours faithfully,

Plas Gwyn, W. R. Davis.
Russell Road,
Rhyl.

[We deeply regret to record that, as intimated elsewhere in this issue, the writer of this letter —a valued contributor to our columns over a great number of years—passed away on Friday of last week.—Ed., *V.R.*]

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TESTING FOR UNCONSCIOUSNESS AFTER AN ELECTRIC SHOCK

To the Editor of The Veterinary Record

Sir,—In *The Veterinary Record* of January 12th, Sir Leonard Hill has given us one or two important observations on the reactions of the human subject in anæsthesia produced by narcotics and compares the effects of the electric stunning apparatus on animals.

During four years' experience in the use of electricity for stunning purposes, I have never seen any animal (cattle included) show evidence of sensitiveness or any reflex in the skin when cut for bleeding, after being stunned by this method.

Yours faithfully,

Sheffield. Wm. Tweed.
January 15th, 1935.

The Editor acknowledges, with thanks, the receipt of the following:—

Report of a meeting of the North of England Division, N.V.M.A., from Captain J. R. Rider, Hon. Secretary.

Communications from Mr. N. Dobson (Weybridge), Major Hamilton Kirk (London) and Mr. J. F. D. Tutt (Winchester).

Diseases of Animals Acts.

SUMMARY OF RETURNS

Period.	Anthrax.		Foot-and-Mouth Disease.		Parasitic§ Mange.		Sheep Scab.	Swine Fever.	
	Outbreaks confirmed.	Animals attacked.	Outbreaks confirmed.	Animals slaughtered as diseased or exposed to infection.	Outbreaks reported by the Local Authorities.	Animals attacked.	Outbreaks confirmed.	Outbreaks confirmed.	Swine slaughtered.
	No.	No.	No.	No.	No.	No.	No.	No.	No.
Period 16th to 31st Dec. 1934	24	34	4	396	4	4	47	105	48
Corresponding period in									
1933	19	21	—	—	4	9	53	48	11
1932	17	22	7	1,237	6	18	54	43	24
1931	23	25	—	—	5	6	45	114	70
Total 1st January to 31st December, 1934	395	453	79	10,245	115	187	686	1,832	1,026
Corresponding period in									
1933	297	345	87	7,805	132	225	578	1,414	901
1932	344	418	25	2,659	127	204	361	1,555	757
1931	465	516	97	10,649	138	237	347	2,026	902

Note.—The figures for the current year are approximate only. § Excluding outbreaks in Army Horses.